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Specifications for Grading Sulphonated Oils

By RALPH HART

Hart Products Co.

The need for specifications in grading sulphonated oils is recognized by both producers and consumers. In this article the author proposes a method for grading sulphonated oils of the glyceride type based on moisture content only.

UNDER the auspices of R. L. Gilbert of the Bureau of Standards, a conference of manufacturers of sulphonated oils was recently held in New York to consider specifications for grading sulphonated oils. The need for such action is generally conceded both by producers and consumers of such products. Methods of grading were discussed according to (a) fatty matter, (b) active ingredients, and (c) moisture content. There were many who favored grading the oils according to the concentration of fatty matter determined by one of the available extraction methods. This was opposed by others who claimed that it did not take into consideration the organically combined SO_3, an active ingredient which is claimed to be at least as important as the fatty matter and should therefore be included with it. The majority, however, were in favor of a grading method based upon moisture content and non-essential ingredients.

The discussion was further complicated by the attempt to have the same or similar specifications cover entirely different types of sulphonated oils — namely, pure sulphonated oils of the glyceride type, sulphonated oils naturally containing high percentages of unsaponifiable matter such as sperm oil, wool grease, etc., and blended sulphonated oils containing mineral oils and other added unsaponifiable matter. It seems that the problem would be greatly simplified by drawing up separate specifications for the different types of oil. The writer proposes the following method for grading sulphonated oils of the glyceride type (castor oil, olive oil, neatsfoot oil, etc.), which he believes to be simple, logical, fair and correct in grading the oils. It is based on moisture content only —the unavoidable non-essential ingredients to be kept within certain limits by specifications.

Definition, Grading, and Type Used in Proposed Method

Definition—For the purpose of these specifications, a sulphonated oil shall designate the product of interaction between a saponifiable oil or fat of the glyceride type or its fatty acids, and sulphuric acid or similar sulphonating agent, the reaction to take place under such conditions that some or all of the oil is converted into a sulphate or sulphonate. With the exception of water and alkali, it shall contain no other admixture.

Grading—The grading, strength, or concentration of sulphonated oil shall be based on its moisture content and shall be expressed as 100 per cent minus per cent moisture.

Type of Oil—A sulphonated oil, stated to be made of a certain raw oil, shall contain at least 50 per cent of that oil before sulphonation, based on the total raw oil.

SPECIFICATIONS

Organically Combined SO_3—Sulphonated oil shall contain a minimum of 3.0 ± 0.3 per cent organically combined SO_3, based on the water-free sample.

Unsaponifiable Matter—Sulphonated oil shall contain no more than 1.5 per cent unsaponifiable matter, based on the water-free sample.

Inorganic Impurities—Sulphonated oil shall contain no more than 2.0 per cent inorganic impurities, based on the water-free sample.

Total Ingredients—The sum of the following ingredients in a sulphonated oil, expressed as percentages, shall be equal to at least 100 per cent: (a) water, (b) inorganic impurities, (c) total fatty matter, (d) total alkali bound as soap, calculated as Na, and (e) neutralized organically combined SO_3.

METHODS OF ANALYSIS

(a) *Moisture*—Weigh between 7 and 15 grams of the sample (depending upon the amount of water present) into a flask of 250 to 300 cc. capacity and add 75 cc. of water-saturated xylol, prepared by heating a mixture of water and xylol with frequent shaking and subsequently removing the water in a separatory funnel. Connect the flask to a reflux condenser and a calibrated receiving tube, and distill moderately until there is no further increase of water in the tube. The percentage of moisture is obtained by dividing the cubic centimeters of water in the distillate by the grams of oil taken.

(b) *Inorganic Impurities*—After determining the moisture as above, add to the anhydrous solution oleic acid, about twice the weight of the sample taken for analysis, and filter boiling-hot on a counterpoised filter paper. Wash the residue three times with 20 cc. portions of hot xylol, twice with 20 cc. each of hot absolute alcohol, and twice with 20 cc. portions of ethyl ether. Finally, dry the filter papers at 103 to 105°C. to constant weight. A Gooch crucible with suction may be used instead of filter paper. As a precaution against the presence of organic matter due to incomplete washing, the residue may be ignited and weighed.

(c) *Total Fatty Matter*—Weigh 5 to 10 grams of the oil into a 500 cc. Erlenmeyer flask and add 25 cc. of water and 30 cc. of concentrated hydrochloric acid. Boil while shaking for about 15 minutes, or until the oil and water layers become clear, cool, extract the fat three times with 50 cc. portions of ethyl ether, and wash the combined ether three times with 10 cc. portions of water, or until the wash water is neutral to methyl orange. Evaporate the ether and dry the residue to constant weight at 105°C.

(d) *Total Alkali as Soap*—Weigh 10 grams of the oil into a 250 cc. Erlenmeyer flask, dissolve in 150 cc. of water (warm if necessary to effect solution), add 30 grams of granulated salt, 25 cc. of ether, and 5 cc. of methyl orange indicator, and titrate with 0.5 *N* sulphuric acid.

$$\% \text{ Total Alkali as Na} = \frac{0.041 \text{ (cc } H_2SO_4 \times \text{titre } H_2SO_4 \text{ in mg. KOH)}}{\text{sample}}$$

$$\text{Total Alkalinity } (A_t), \text{ mg. KOH per gram} = \frac{\text{cc } H_2SO_4 \times \text{titre } H_2SO_4}{\text{sample}}$$

(e) *Organically Combined SO_3*—To calculate the organically combined SO_3, weigh 8 grams of the sample into a 300 cc. Erlenmeyer flask and boil for 1 hour under a reflux condenser with 25 cc. or 1.0 *N* sulphuric acid (use glass beads to prevent bumping and shake frequently). Wash the condenser into the flask. To the cooled mixture add about 20 cc. of ether, 100 cc. of distilled water, 30 grams of granulated salt, and 5 cc. of methyl orange indicator. Titrate with 0.5 *N* sodium hydroxide, stopper the flask, and shake frequently during the titration. Deduct the amount of sulphuric acid added from the equivalent of the amount of sodium hydroxide required to neutralize, and calculate the difference to mg. of potassium hydroxide per gram of sample (F).

$$\% \text{ organically combined } SO_3 = \frac{8 \quad (F + A_t)}{56.1}$$

$$\% \text{ neutralized combined } SO_3 = 0.2124 \ (F + A_t)$$

(f) *Unsaponifiable Matter* — Weigh approximately 10 grams of oil into a 250 cc. Erlenmeyer flask and add 50 cc. of an approximately 1.0 *N* alcoholic potassium hydroxide solution. Boil one hour under reflux condenser and cool. Add 40 cc. of water and transfer to a separatory funnel. Shake at least three times with petroleum ether (b.p. 40° to 75°C.) using 50 cc. each time. Wash ether extract at least three times, the first time with slightly alkaline 50 per cent alcohol and the following washings with distilled water. Evaporate ether extract in a tared vessel, dry, cool, and weigh.

It will be noticed that the specifications call for at least 50 per cent of the total fatty matter to represent the kind of oil from which it is claimed the sulphonated oil is made. This amount leaves the manufacturer room for the blending of pure sulphonated oils, often yielding a product superior to the individual oils, and moreover, in most cases the admixture of other similar sulphonated oils can be proved conclusively only when present in comparatively large amounts.

The unsaponifiable and inorganic impurities are included with the fatty matter not only because it makes for simplicity in the grading, but also because they are unavoidable impurities and within certain limits beyond manufacturing control. Under these specifications it would be possible for the unscrupulous manufacturer to

(Continued on page 33)

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

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CALENDAR OF COMING EVENTS

Meeting Northern New England Section, January 9th.

* * *

Council and Research Committee Meeting, Chemists' Club, New York, January 22nd.

* * *

Meeting New York Section, January 22nd.

NOTICE TO READERS

Here follows a report of the Saturday morning session as completely as we have received it. All papers and reports given at the Annual Meeting have been carefully edited by the author. This necessitates considerable delay inasmuch as the stenographic reports have to be mailed out to be corrected or revised. It is hoped that the remainder of the report on the Annual Meeting will be ready for publication in the January 18th issue of the Reporter.

SATURDAY MORNING SESSION

December 5, 1931

The meeting convened at ten-forty o'clock, P. J. Wood, President of the Association, presiding.

President Wood: Ladies and Gentlemen: We were to have started this meeting at ten o'clock but unfortunately our first speaker, Mr DeLeeuw, was unable to be here. We decided therefore to start the meeting at ten-thirty in the hope that the late comers would then be on time and that the private talking would be all over.

The first subject this morning is undoubtedly interesting to most of us and it is to be given by a gentleman who is too well known to need any introduction. The title of the paper is, "The Mechanism of the Dyeing Process," and the paper will be given to us by Dr. Robert E. Rose, Director of the Technical Laboratories of E. I. du Pont Company.

(Dr. Rose's paper will be published in the next issue of the Reporter.)

Our next speaker is a specialist in color measurement and specification. Miss Nickerson was I believe for six years with the Munsel Color Company, who are well-known in that particular branch of endeavor, and for the last three or four years she has been connected with the United States Department of Agriculture, working on the subject on which she is to address us today. Is Miss Nickerson ready to present her paper? Her subject is, "Cotton Fiber Quality: Its Measurement in Relation to Standardization and Utilization."

Miss Dorothy Nickerson: If I am to cover the subject that I have in mind without going off on all the interesting sidelights I will have to read my paper and I hope you won't mind.

. . . Miss Nickerson then presented her prepared paper.

Proceedings of the American Association of Textile Chemists and Colorists

Cotton Fiber Quality

Its Measurement in Relation to Standardization and Utilization

By **DOROTHY NICKERSON**

Color Technologist, Bureau of Agricultural Economics, U.S.D.A.

COTTON fiber quality, and its measurement in relation to standardization and utilization, the title announced for this paper, is a subject much too broad in scope for me to attempt to outline to you, even as respects the work of the single laboratory which I represent. What I do wish to bring to your attention today is something which covers but one chapter of this subject, one in which you, as textile chemists and colorists, should have particular interest, yet one which is often overlooked or undervaluated in the midst of the many technical advances that are being made so constantly in the chemistry of dyeing. The subject to which I call your attention is that of the color variations of the raw stock, and the necessity for considering these variations in relation to finished cotton goods.

Cotton is grown in this country from Virginia and the Carolinas in the east to California and Texas in the west. Since it is a product of plant growth, the varied conditions of soil, temperature, and rainfall, as well as difference in variety, all leave their imprint upon it, so that when the crop becomes available for use by the manufacturer it varies in many ways, in length, strength, fineness, cleanliness, color, etc. We know from experience that these differences have an effect upon the efficiency of manufacturing processes and upon the quality of the products manufactured. It is therefore necessary to select, for any particular purpose, cotton which possesses those particular properties which make it more suitable than any other. Some system of quality criteria, and of quality measurement, must be provided for this purpose. Such a system should be so devised as to make it possible to value cotton intelligently in terms of both money and relative usefulness, to permit buyers and sellers to describe these cottons satisfactorily to each other at great distance or over periods of time, and not least important, to give the grower some tangible means of understanding, in terms of quality, what the world market demands. Obviously, such a system must be fixed and uniform and in common use. It has therefore been made the duty of the Div. of Cotton Marketing of the Bureau of Agricultural Economics to establish standards, to prepare and distribute copies of them for use by the entire industry, and to conduct studies on cotton quality as a means of developing such standards.

As the work has progressed, increasing attention has been given to the utility or comparative use values of the different cottons as a basis for determining what factors of fiber quality should be included in the standards, what weight should be given to each of these factors, the number of gradations, etc. The work of the fiber laboratory is aimed toward the discovery and measurement of relationships between fiber properties and spinning behavior and quality of yarn and fabrics, in order that standards may be developed on this principle of utility.

In studying raw cotton it should be kept clearly in mind that color is a matter of double, or even triple importance. First, the color of the fiber directly affects the color of the finished goods, second, color may be useful as an index of other conditions or properties associated with it, and third, the color of samples may indicate differences in surface appearance.

An example of the first case is that of low quality cottons which—even if they could be found satisfactory from the spinner's point of view as regards strength, uniformity, length of staple, etc.—would, for many purposes, prove unsuitable on the basis of color alone. Used as an index of other conditions or properties—our second item—we might cite the example of grade, for there is such general regularity in the combination of light clean colors with a small amount of trash, and of dark, dirty colors with a great amount of trash, that grade—which consists of the three factors, color, trash and ginning preparation—is highly correlated to color. We are studying many fiber conditions and characteristics and their relationship to fiber color, among which are those that reveal themselves by failure to bleach and dye equally well. The third item of importance, that of appearance—as against actual fiber color—is illustrated by the color appearance of cottons having different ginning preparations. Differences in samples of lint from the same lot of seed cotton, one poorly ginned and one well ginned, will be shown up by color measurements if the sample surface measured is representative of the ginning preparation. The lint color will

not have changed, but the fiber mass will be so much rougher in one case than another that the preparation differences will reflect themselves in color measurements of the surface.

For a number of years the subject of failure to bleach and dye equally well has been an important consideration in grade studies. As early as 1914, grade being at that time the most objective description of cotton color, tests were made of the official standards. (Bulletin 591, 1917, out-of-print.) The results were comparative, showing that when the white grades were bleached under identical conditions, grades 1 and 3 were practically identical in color, grade 5 was not as "pure a white" as 1 and 3, but "gave satisfactory results for commercial purposes," grade 7 showed a slightly slaty color when compared with the other grades, and grade 9 was easily distinguished by a slaty, bluish cast.

A few years later (Bulletin 990, 1921, out-of-print) manufacturing tests were made of the standards for yellow tinged and both yellow and blue stained cottons. Eight grades of cotton were used, and in order that you may see the effect of bleaching and dyeing these extreme color grades I have brought with me an exhibit of 22's yarn, from raw stock to the bleached and dyed yarns.

Again in 1927 (Bulletin 1488, Manufacturing Tests of the White Grades of the Universal Standards for American Cotton, by H. H. Millis, available) there was published a study of the nine white grades of the universal standards, and for the first time attempts were made to measure the comparative brightness of the raw stock, the gray cloth, and the bleached and mercerized cloth.

Later still, as part of a cooperative study with the Bureau of Home Economics, cotton of grades 3, 5, and 8 were manufactured into sheeting. I have brought with me samples of the raw stock, the gray cloth, and the bleached sheeting. You will note, as you compare the raw stock, that there is very little difference in the fiber colors of the two better samples even though they represent different grades. Color measurements show that there is very little brilliance difference between them. The bleached sheetings of these upper grades also show little commercial difference. But as between these two samples and the third sample there is considerable difference, both in the raw stock and in the bleached sheeting.

In order to indicate to you the changes in physical powers of reflection between gray and bleached materials I have brought with me a series of three widely different colors made up into gray cloths. Mr. Appel, of the Bureau of Standards, needed examples of this nature to present to the Optical Society last winter. He bleached these gray cloths, making spectrophotometric measurements before and after bleaching. The results are indicated in the first slide. You will note that the change from scoured to bleached goods is relatively small in the red end of the spectrums for each material when the same bleaching process is used. A dark sample, with any practical amount of bleaching, remains a dark bleached sample, while a light clean gray cloth bleaches out relatively lighter than the dark sample. It seems important that the bleached cloth reflects very little more light than does the scoured material in the red end of the spectrum, the greatest relative change being toward the blue end. (The fact that the washed sample of the whitest cotton does not hold its relative position on the scale is due to the fact that in this preliminary test all three samples were washed together, the cleanest of the samples becoming dirtier, rather than cleaner, by washing!)

In none of these tests was there an attempt made to do more than arrive at a general average, for no attention was given to the fact that small color differences may be important. Variations within grades are generally in fiber color, and are small, while the color difference between grades may be either in fiber color or in a difference in the amount of dirt clinging to the fiber, some of which will adhere even through washing. It is the color differences in the fiber that cause more trouble in dyeing than even larger differences caused by dirt, for dirt—within limits—can be washed out. We have, as an example, the experience of a finisher with a lot of gray goods that was run through the same processes. The result gave two lots of white goods, one whiter than the other. Inquiry showed that the gray goods had come from different mills, but, being made according to the same specifications and looking alike on observation, they had been combined by the customer. Contrasted to this experience is one of my own, when, in measuring gray cloth samples of different grades, three were found to give an identical result. The answer was simple, for the fiber color in these grades was the same when the dirt was washed out.

The question of the importance of small color variations in the raw stock is one on which there is no unity of thinking within the trade. A few years ago it was necessary for us in Washington to have information on what the trade thought on this subject. We interviewed representatives of different mills—cotton buyers, chemists in charge of dyeing, and the research staffs in the laboratories.

Almost without exception, the chemists and laboratory staffs informed us that color of the raw stock made no difference to them, that is, with the one qualification that they could not bleach the so-called "blue" cottons satisfactorily. And we found that the explanation of their lack of difficulty was the efficiency of the cotton buyers of those mills, men whose experience taught them what to give the mill in order to produce certain results. In fact, experience had so generally taught them to follow certain rules in buying that in many cases the reason for those rules had been lost sight of, for even the cotton buyers would sometimes say that color made no difference except as to blues. In the very next breath they would say very frankly that they bought only Strict Middling (No.

4) or Middling (No. 5) color and above for fine goods or for dyeing light colors, and when asked why, the answer was that mixtures with even one grade lower were liable to streak. In most of the mills visited, very little cotton was used below Middling or Strict Low Middling for any goods which was to be bleached and dyed, a further evidence of this practice of avoiding color difficulties by an efficient cotton buyer.

Then of course, there were those to whom even the slightest of color differences was a concern, and so much of a concern that they had made some attempt to discover the cause of the difficulties. Hosiery manufacturers, for example, makers of plush yarns, of book and curtain cloth, all have difficulties in producing even colored gray and finished goods or goods that can be matched with other lots.

But because commercial dyers have had such wide tolerances in the matter of matching goods—most of the difficulties in matching being laid to the chemical and technical difficulties in dyeing—it has only been in the case of the streaked goods that there is perfect evidence that there was other cause than an inability to match two dyes.

There is, of course, a partial answer to such difficulties, the one suggested a moment ago, the one with which cotton buyers have protected the mills for a long time. That is, they learn the purpose for which each lot of cotton is to be purchased, they buy from the same general districts all the cotton that is used for a single purpose, and they see to it that there is a thorough mix of many bales in making up the yarn for each of these purposes.

But we must do more than that if we are to have adequate standards. We must find the cause of color variations in the raw stock, discover the characteristics that are associated with them, and relate these variations and their associated characteristics to their effects on the finished goods.

With this purpose in mind we have set up and are working on several projects which are laying the groundwork for what we hope will be a complete answer to these questions.

First, of course, we must know the amount of color variations included in the established series of universal grade standards. Measurements made on ten thousand or more samples have provided us with this information. From these data a master chart has been constructed, one to which all further cotton color studies are referred and compared.

Next we must know the amount of color variation that is included in the American cotton crop. This information is gradually becoming available through the collection of samples which represent the crop year by year. This year, for example, we shall receive a sample of cotton taken during each visit made to every gin by the field men on the grade and staple estimate project. Each field man visits several gins each day, and since there are about 25 of them at work throughout the ginning season, these cottons should give us a representative picture of this years crop.

Because it has undoubtedly been, in the past, the lack of a quick and practical method of color measurement that has retarded the study of such a subject as this, perhaps I should take the time to explain something of how we are measuring the color of these samples.

Most of you, being chemists, think of color in terms of material dyestuffs, or of concentration and mixtures. Many of you have used a spectrophotometer, an instrument which is invaluable in your industry for measuring the physical powers of reflection or absorption of dyestuffs or dyed materials. Color, however, is not measured on a spectrophotometer or on a color analyzer, as many of you well know if you have tried to interpret the reflection curves in terms of color. For color is a matter of seeing. I shall not have to go in to all this, for Dr. Scott has previously described to you and to the Dye Division of the American Chemical Society a simple numerical notation for expressing color in terms of hue, the color name; brilliance, the attribute of light and dark; and chroma, the attribute of color strength or weakness. There are published papers[1] on the subject and descriptions of instruments that are available for making measurements in these terms.

Given such a notation, and instruments adapted to work with cotton, we may go on to study some of the questions underlying this entire subject of color in cotton, that of stability, for example. At the present time we know that there is a wide range of color in cotton, variations which necessitate distinctions between yellow stained, yellow tinged, spotted, white, gray, and "blue" cottons as well as between high and low grades of each of these color classifications. Not only must we learn the cause of the variations but we must also learn how stable these different colors are. With such information as a background we can then go on to study more specifically the bleaching and dyeing properties of cottons, regardless of whether we wish to know the difference in finishing quality between a white and a "blue stained" cotton or whether we wish to know the difference between two cottons of the same grade, one grown in the east, the other in the west.

In order to discover the conditions under which the colors of cottons are stable and unstable, the relative stability of the different colors under various conditions, and the extent of the changes which take place, a study is being made of the subject. Such a study cannot be made on random samples selected from the open market since we know already that two cottons, apparently alike, may change in different ways; one may become whiter, the other yellower. If any conclusions are to be drawn from our study, the history of the cotton must be available, and since all possible wide color variations should be a part of the experiment, it is necessary to procure the

material from such different portions of the cotton belt as are most apt to have those differences of climate, soil, etc. that will result in wide color differences. During the 1930 season, cotton was procured from the Clemson College Experiment Station in South Carolina. This year other stations are cooperating to provide material from South Carolina, from Mississippi, from three stations in Texas, and from Arizona, the Arizona cotton including both Pima and Acala. For our purposes a large group of bolls are tagged at a suitable time. The cotton is picked at regular intervals from the date of tagging until early spring when no further bolls remain on the stalks. This provides widely different color material for study, for as the cotton remains in the field under conditions of natural exposure, the color changes, becoming generally darker and duller, and acquiring gray spots. We hope this year to obtain also the yellow tinged and stained cottons. Color measurements are made on all samples as they are received, and weekly measurements are made thereafter in order to follow the change under storage. On a portion of these samples, strength tests, spectrophotometric tests, moisture regain tests, are being made. Other portions of the samples are being subjected to various conditions of high and low temperatures, both on ginned lint and seed cotton. Tests will be made for fiber length and uniformity, for per cent of thick and thin walled fibers, for weight per unit length, for exposure under ultra-violet. Color, strength, and regain tests will be made on all samples after exposure in other tests. There are other tests that should be made such as microscopic, x-ray, and chemical tests, and material is being reserved for these purposes. As is evident, the material not only provides a basis for controlled laboratory tests, but it gives as a by-product an opportunity to measure the changes that take place under conditions of field exposure.

Measurements of the first year's samples, as shown in the next two slides, indicate that under such field exposure the cotton becomes darker and what the cotton man calls "bluer" (in reality less yellow). Cotton, when exposed only three weeks after the time when it is ready for picking, shows a lowering of color and therefore of grade. Further exposure causes progressive darkening, while measurements of cotton picked after the middle of January in 1931 are so low that there are no equivalent grades for them.

There are other and quite different questions that we must answer before we can finally determine the effect of variations on the finished material, and that is in regard to the color change in cotton as it goes through various mill processes. We must know thoroughly what takes place as a result of the physical treatment of the cotton in making gray yarns and fabrics before we can hope to study successfully the effect of later chemical treatment which comes in dyeing and finishing.

I shall not attempt to describe to you the details of this study but shall present one chart to illustrate the brilliance change in twenty-three lots of cotton from raw stock to gray cloth. The lots consist of four grades selected from the eastern, central and western parts of the cotton belt, each section having been requested to furnish three lots of each grade, the lots to represent the white, normal, and yellow sides of the grade box. It was not possible to procure all the samples of each grade that were requested from the different offices, but as many as could be found were spun. On the chart brilliance is plotted with the darker colors near the bottom, the lighter colors near the top. The complete lines represent the brilliance change from the raw stock to the final carding. The solid line represents the change that took place in the picker room, that is, from the raw stock through the finisher picker, while the dotted lines show the change from the finished picker through the card. The dots represent the brilliance of the gray cloth.

The grades are grouped from left to right, Good Middling (No. 3) to Good Ordinary (No. 9). The short horizontal lines give the brilliance measurements of the standards which these cottons were selected to represent as closely as possible. You may note that the raw stock of the higher grades is a bit lower than the standards while that of the Good Ordinary is high, especially for those samples that were intended to represent the normal side of the box. The difference in the low grade is explained by the fact that the color of the cotton in the low grades throughout the 1928 season was very much higher than the leaf.

There are one or two things that are brought out in this chart quite clearly, first that there is a tendency for the card samples of the lower grades to approach each other, second that the greatest change takes place in the picker room for the high grades and in the card room for the low grades, and third, that the cloth samples measure darker than the card samples, and by approximately the same amount for each grade. The difference between measurements of cloth and card samples is undoubtedly caused by the difference in the surfaces presented by the two samples. The cloth, being woven, would measure somewhat darker than the card sliver. It may be noted that the cloth samples made from Middling cotton from two of the districts is very close to the original measurement for brilliance of the raw stock.

You may note that in this study we have selected cottons with small differences as well as with large differences. But since bleaching and dyeing tests have not yet been made on these samples we shall leave the discussion of that phase of the subject until the results are complete, for to date these changes may be followed through only to the gray cloth.

So far this paper has brought to your attention, as promised in the opening paragraph, only those phases of our cotton fiber quality research which have to do with

color. Since we do not wish you to suppose that color is the only quality-index with which our fiber laboratory is concerned, I must tell you that other projects concerning staple, moisture, ginning, spinning, etc. are being studied in just as much detail. The microscope, in our Washington laboratories and that of one of our associates at the Boyce Thompson Institute, and the x-ray, by cooperation with the Department of Chemistry of the University of Illinois, are being employed in some studies, the engineering facilities of the new experimental ginning plant in others, and the spinning equipment of co-operating textile schools in still others.

By such methods as these we are attempting to solve the problems involved in studying cotton fiber quality. But in their solution we need the co-operation of groups such as yours, groups that are technically trained to solve practical and theoretical difficulties. We extend to those of you who are interested, individually and in groups, an invitation to visit our laboratories. We also wish to express our desire that you will make available to us any observations or experiences which you think would be of interest or assistance to us in this work.

Meanwhile, keeping always before us the ideal that utilization is the factor with which quality must be linked, it is our hope and aim that measurement of the cotton fiber may be reduced eventually to terms that will clearly and satisfactorily reflect its quality.

REFERENCES

[1] Nickerson, Dorothy, A Method for Determining the Color of Agricultural Products, USDA Technical Bulletin 154, 1929.

Nickerson, Dorothy, Color, A Bird's Eye View of the Field, Textile Colorist, July 1930.

Nickerson, Dorothy, A colorimeter for Use with Disc Mix-Terms, J.O.S.A., Vol. 21, No. 10, Oct. 1931.

Nickerson, Dorothy, Color Measurements on Psychological Terms, I.O.S.A., Vol. 21, No. 10, Oct. 1931.

Scott, Walter M., Color Specifications, Am. Dyestuff Reporter, Dec. 10, 1928.

Scott, Walter M., Color Science Applied to Textiles, Am. Dyestuff Reporter, June 21, 1929.

Scott, Walter M., Practical Matching and Recording of Colors, The Melliand, Vol. 1, No. 2, May 1929.

DISCUSSION

President Wood: Would anybody like to ask Miss Nickerson any questions?

Mr. C. H. Clark: Is it permissible for a non-member to ask a question?

President Wood: Certainly, Mr. Clark.

Mr. Clark: I should like to ask Miss Nickerson whether a study has ever been made by the department or whether she knows of anyone else who has made a study to determine what chemical or physical changes are caused in fiber by color, whether the color represents any physical or chemical changes?

Miss Nickerson: This material is simply a basis for such studies. Before the subject is finally concluded we will have to do that. We are not now set up to make chemical measurements. Through the cooperation of certain people we are getting some material but we do intend to do that in the future.

President Wood: Are there any further questions?

Mr. Martin L. Griffin: Mr. Chairman, I haven't any questions to ask but I simply want to say that it was my pleasure to visit the Exposition of Industries at Cairo last winter and that the work that was shown there that is being done chiefly by the British Government was extremely interesting and very broad. They not only showed what cotton they were producing but they showed all of the allied incidents like diseases, methods of treating the diseases, and all of that, and I was very much struck by that.

President Wood: I think it is only right to say that the same interest is being taken by the Department of Agriculture in cotton growing. I believe a great deal of attention has been paid during the past few years to the matter of breeding of the seed, selection of seed, and so on. A great deal of assistance has been afforded the cotton farmers.

I think the one respect in which the right advice has not been given is as to the amount of cotton that should be produced. I don't know how you are going to regulate that but that has had more to do with our difficulties thany anything else.

Dr. Scott: In that connection I think it might be interesting to have just a word about that line of work from Mr. Webb who is with us this morning. He is more or less in charge of that angle of it at the Department of Agriculture. I would like to have Mr. Webb say a few words on that angle of the question, if he would:

President Wood: Mr. Webb, will you oblige?

Mr. Webb: I am very glad to be with you people this morning.

Miss Nickerson has given a bird's eye view of her work in our laboratories. We are carrying on physical and biological work and are getting ready now to start some chemical work.

Our main job is to scientifically find out what is quality in cotton and use that information as a basis for our standardization. If we can lay a scientific basis for quality in cotton, it is very evident that we will have for the first time a real scientific basis for the breeeding and production of cotton, for the ginning of cotton, and for the marketing of cotton.

We hope that all of you will drop in to see us whenever you are in Washington. If you are interested or if you have any information you would like to give to us we would be awfully glad to have it and to discuss the problem with you. (Applause.)

President Wood: Thank you, Mr. Webb.

Mr. Griffin was talking about Egypt and Egyptian cotton. I don't know very much about cotton but it strikes me that I saw somewhere that the Egyptian cotton is quite tawny in color and I wondered if that indicated a lower quality. Maybe Miss Nickerson can tell us some-

thing about that and if there is any degree of tawniness which determines the quality of Egyptian cotton.

Miss Nickerson: We have been measuring of course mostly the American cotton. The Egyptian cotton, however, is very much whiter now than it used to be. There used to be a very brown Egyptian cotton which was evidently of just as high a quality as the white cotton. I don't think that that was graded on color. That seemed to be a high quality of cotton. It is entirely different from the American upland varieties which are white and the white creaminess of the color is an indication of the quality. I suspect there is a grading of those browns in that Egyptian cotton but you find very little of it on the market today.

Mr. Griffin: I want to make only one other comment and that is this: I am sure that all those who are present who are at all familiar with the mercerizing process understand the principles whereby cotton is made lustrous. At the same time, there is a great difference in the lustrousness of native cotton and we must admit that has something to do with the surface of it, and it has always appeared to me that any study which would tend to grow cotton of a more lustrous quality would certainly advance the problem of mercerizing and would make it approach silk or artificial silk.

President Wood: Is there any further discussion?

Mr. J. A. Clark: I should like to ask Miss Nickerson if the Department has done any work in identifying the greys from a given sample of grey?

Miss Nickerson: No, that is part of the work we are doing now. The number of grey cloths that we have examined probably isn't more than two hundred. There is a real relation between the grey cloth and the raw stock.

Does that answer your question?

Mr. Clark: Yes. Is there any hope that we will be able eventually to identify the greys from the grey sample?

Miss Nickerson: I think it is very possible that the grey cloth may give you a better picture. It takes up the dirt. A lot of the dirt is removed. So that you have a chance to get into the fiber color, in the original raw stock, very often, the color change. The color is dark and dirty, not because the fiber color is dark and dirty but because there so muc htrash that can be washed out and it is almost impossible to tell that with the eye.

Prof. A. H. Grimshaw: May I ask a question?

The Department of Agriculture know the conditions of the storing of cotton by many of our farmers in the South—very rotten conditions. They store cotton in the backyard or any place at all after it is ginned and baled and it lays out there all winter.

Have they made any tests of cotton that has been laid out all winter? Do they get any difference in color?

Miss Nickerson: Those samples that I showed you on the screen were actually exposed in the field. They were still in the plant. But we are making tests now in the laboratory under these different conditions of temperature and humidity. Of course, that won't take into consideration the soil that will wash into them but it will take temperature and humidity conditions into consideration, and there is a decided change.

President Wood: Are there any more questions? If not, I would like to make an announcement at this time regarding the banquet this evening.

. . . Announcement . . .

President Wood: The next paper is entitled, "Some General Considerations on the Application of Electrometric Measurements."

The speaker comes to us from Leeds & Northrup Company who as you all know are makers of precision instruments. He is a graduate of Clark University with the degree of Ph.D. and specializes in electrochemical research.

Dr. Greer! (Applause.)

Some General Considerations of the Application of Electrometric Measurements

***By* DR. W. N. GREER**

MR. CHAIRMAN, I see I have about minus one minute in which to give this paper.

Please understand that I am not a textile chemist. If I were perhaps I could say something that would be of more interest than an abstract subject such as electrical measuring instruments will be.

There are two general types of electrical measuring instruments which are finding increased uses in the textile industry as well as many other industries, these being the Wheatstone bridge as used in electrolytic conductivity measurements, and the potentiometer as used in pH measurements.

Their increased use has been due not only to new and improved equipment but more to the need for equip-

ment which will give an almost immediate analysis and which will give continuous analysis.

From the manufacturing standpoint, that is, the manufacturing of electrical instruments, it is very easy to make an instrument which in itself will be accurate to within certain definite limits, since it is only necessary to compare the various units, such as resistance units in the instrument, against known standards.

The external part of the equipment, however, such as the electrodes, involves an entirely different question. This can perhaps be brought out best by very briefly and informally considering a few types of electrodes.

Our standard electrode in pH measurements is of course the calomel electrode, of which we have three or four different types, distinguished from one another by the concentration of the potassium chloride used in them. The most common types are the tenth normal, normal, and saturated calomel electrodes, the saturated electrode being the one most largely used because it is most easily prepared. It is only necessary to have an excess of potassium chloride present to insure the saturation at any temperature at which you are working.

One point often overlooked in the use of the calomel electrode, particularly out in a plant, is the difference in temperature between the solution being measured and the calomel electrode itself. If one were making a number of different measurements on solutions at different temperatures, it is quite possible that the calomel electrode would not be at the temperature of the solution being measured, and of course an error would be introduced.

Some idea of the magnitude of this error can be given by stating that a difference of, say, ten degrees centigrade between the electrode and the solution will introduce an error of approximately fifteen-hundredths of a pH.

This leads us to believe that the ideal calomel electrode would be one made up with a small body of mercury and vessel so designed that it could be immersed in the solution to be measured. With a small body of mercury it would readily assume the temperature of the solution and thus minimize any error due to temperature differences.

The hydrogen electrode has been the standard for all pH measurements, perhaps because it was among the first to be investigated. One chief advantage of it is that it is applicable over the entire pH range within certain limitations. That is a phrase that is overworked but very necessary, "within certain limitations."

To give good results the hydrogen electrode of course should be properly prepared as far as cleaning the element and platinizing is concerned, but one of the biggest troubles or possible sources of error with the hydrogen electrode is the presence of oxygen in the hydrogen gas being used. There is about eight hundred millivolts difference, which would correspond roughtly to fifteen pH, between the normal oxygen electrode and the normal hydrogen electrode. The presence then of one per cent of oxygen in the hydrogen gas would give an error of about fifteen-hundredths of a pH. This is the reason that, for real precise measurements, the sample should be excluded from contact with the air.

The poisoning action of a good many substances has been fully outlined in the literature. There is no need to go into that.

The quinhydrone electrode has largely displaced the hydrogen electrode particularly for use in acid solutions. Some seem to have the idea that the quinhydrone electrode cannot be used above a pH of seven, which is strictly true if you want the most precise measurements. However, in the great majority of measurements it is applicable up to pH nine, with a possible error of a tenth of a pH.

One point worthwhile mentioning perhaps in connection with the quinhydrone electrode is the fact that in general it requires very little quinhydrone to give the necessary equilibrium. In an ordinary aqueous solution it requires about seven milligrams to a hundred c.c. sample. The tendency when using crystalline quinhydrone is to add a great excess. This can be avoided by using a saturated solution of quinhydrone in either alcohol or acetone and adding a few drops of this to the test sample. A one hundred c.c. sample, for instance, usually requires about six or eight drops of an alcohol or acetone saturated solution to give equilibrium.

This has the further advantage of assuring almost immediate equilibrium. It requires less than a half minute to make the measurement after introduction of the quinhydrone.

One other point I would like to mention is the misapplication of equipment of this type on unbuffered solutions. Unbuffered solutions are the most difficult ones to measure and it is surprising how many people feel that they can check their equipment by measuring distilled water in an attempt to obtain a pH of seven. In the first place, with ordinary laboratory equipment it is practically impossible to make pure distilled water, which will give the theoretical pH of seven. Distilled water readily absorbs CO_2 and thus becomes an acid solution.

Discussion

President Wood: Thank you. A great many of us are interested in pH control in handling the different operations in our industry. Are there any questions?

Mr. Hunter: I would like to ask two questions:

First, what is the status of the glass electrode; and,

Second, is it possible to measure pH in a bleach liquor electrically?

Dr. Greer: There has been considerable work done on the glass electrode. I feel that anything I might say on that would be treading on somebody's toes. I believe it

generally understood that the glass electrode probably cannot be used above a pH of ten, or thereabouts, and I believe that to date it has been necessary to calibrate each glass electrode by itself, often before and after every measurement.

I further believe that the tendency will be away from the very thin membrane glass electrodes, not only because they are fragile, but because they don't stay put for very long.

As far as oxidizing solutions are concerned, the glass electrode seems to be about the only one we shall be able to use. We have hopes of working that out.

Dr. C. Z. Draves: I might say that people sometimes have trouble with the calomel reference electrodes, and they might find it easier to use the quinhydrone reference elecrtode. Biilmann, in Bull. Soc. Chim. (4) 41, 213 (1927), describes that electrode. I believe it contains tenth normal hydrochloric acid. Anyway, you can look it up, and you will find that electrode is very easy to make and is a very serviceable electrode in place of the calomel electrode.

I wondered if Dr. Greer's experience bore that out?

Dr. Greer: It has been used. We use it some ourselves but we still consider the calomel electrode the best.

We have recently designed the calomel electrode which I mentioned, a small one, which can be immersed in the solution. We operated it continuously for five weeks without giving it any attention at all.

Dr. Draves: There is one other suggestion I would like to make, in connection with something which isn't so commonly known as it ought to be, and that is that one of the easiest ways to prepare hydrogen absolutely free of oxygen is to use an alkaline hydrosulphite solution. Various methods have been described of passing hydrogen over platinized asbestos and one thing or another. The easiest way is to prepare a strong solution of sodium hydrosulphite containing about equal parts of caustic soda and the hydrosulphite. To that it is best to add the sodium salt of anthraquinone beta-sulphonic acid, which is red when reduced and loses its color when oxidized. It is best to have two of these solutions in series and bubble the hydrogen through them. When the hydrosulphite becomes used up in the first absorption bottle you can take that out and use the second absorption bottle as the first, put a new solution in the first, and thus reverse them each time.

That is the most serviceable way I know for producing hydrogen free of oxygen. I wondered if Dr. Greer had used that system.

Dr. Greer: We haven't. What we have made a practice of doing is to use this commercial hydrogen as obtained in cylinders under pressure, and for ordinary work simply pass it through an alkaline pyrogallol solution. when we want to remove the last traces of oxygen we use platinized asbestos.

Dr. Milton Harris: I would like to ask Dr. Greer a question.

In determining the pH of protein solutions there is a tendency for the protein material to deposit on the gold of the quinhydrone electrode or the platinum of the hydrogen electrode so that they both require attention very frequently. I wonder if you can give me any idea as to the relative merits of those two and which one you would prefer to use.

Dr. Greer: I feel that the quinhydrone electrode is the best one to use in protein solutions. These usually poison the hydrogen electrode very readily. We have found it very advantageous with the quinhydrone electrode, in which we use gold as a noble element, to clean that electrode frequently by simply heating up to the boiling point in a fifty per cent solution of nitric acid.

Dr. Chapin: The poisoning effect on the hydrogen electrode is less troublesome if you keep the hydrogen surging from the top clear to the bottom of the electrode, even enough to give a little flicker to the galvanometer. The electrode will still poison, of course, but not so quickly.

President Wood: Are there any further questions, gentlemen? Hearing none, we will proceed to the next business which is the business meeting.

Annual Business Meeting

President Wood: The meeting will please come to order and we will hear first the Secretary's report.

. . . Secretary Morrison presented his prepared report . . . (Applause.)

Secretary's Report

December 6, 1930 to December 5, 1931

Since the Annual Meeting in Chattanooga, Tenn., December 5th and 6th, 1930, the Council and Research Committee have each had eight meetings as follows:—

Jan. 16, 1931—Engineers Club, Boston.
Feb. 27—Chemists Club, New York.
Mar. 20—Engineers Club, Boston.
Apr. 17—Chemists Club, New York.
May 15—Engineers Club, Boston.
Oct. 16—Engineers Club, Boston.
Nov. 6—Chemists Club, New York.
Dec. 4—Hotel Statler, Boston.

Our Association, like others, and business in general, has felt the effect of the depression in that we have not increased our membership as in the past few years, but nevertheless our figures are in the black, as we have gained three members.

The following numbers have been elected to the different classes of membership:

Active	91
Junior	33
Associate	21
Corporate	3
	148

53 less than last year.

There have been the following suspensions because of non-payment of dues:

Active	69
Junior	26
Associate	8
	143

five more than last year.

There have been resignations to date as follows:

Active	17
Associate	5
Corporate	7
	29

four more than last year, but as seven of these are Corporate members our funds for research will be slightly lowered this next year as we have only received three new Corporate members this past year.

There have been brought to our attention deaths as follows:

Active	11
Junior	1
Honorary	1
	13

eight more than last year.

Twenty-five members have been transferred from Junior to Active membership.

The membership at present is made up as follows:

Active	1094
Junior	146
Associate	52
Corporate	31
	1323

As most of you are aware, our Research Program has been given a considerable impetus this year because of a grant of $5,000 from The Textile Foundation, which enabled us to engage two more Research Associates. It is hoped further help will be forthcoming from this source, as we feel, as the report of the Research Committee will show, that we have accomplished considerable.

Members residing in Southern Georgia, Southern Alabama and Southern Mississippi, finding it difficult to attend meetings of the Piedmont and South Central Sections, felt they should have a section of their own, and as a consequence did form a new section which received the approval of the Council at the meeting of October 15th, 1931. The section is known as the South Eastern Section.

In accordance with requests from men interested in Textile Schools and students of such institutions, the Council has seen fit to cause to be made certain changes and amendments in the Constitution, on which the membership will be asked to vote at this meeting, whereby a Student Membership is created at half the present annual dues. This membership is open to students only of technical institutions of established standing who are following courses leading to entrance into occupations as textile chemists or chemists otherwise directly concerned with the application of dyestuffs, or as dyers, bleachers or finishers. This will better enable young men in school to become associated with us during a period of their career when in many cases every cent must count, and become more interested in our endeavors and eventually become valuable active members.

The membership will also be asked to vote on a change in the Constitution, in the Article dealing with arrears which will make it a little more attractive to members who have resigned or have been suspended for non-payment of dues to seek reinstatement. A great effort is now being made by several local sections to get old members reinstated.

As you are aware, this is my last report as Secretary of your Association, as reluctantly I have found that I must retire. The Association is now of considerable size, and the details of the secretary's office are so considerable that I recommend to the Council that a paid secretary be employed just as soon as they see their financial coast clear to do so

In passing, I wish to thank the members of the Council and Research Committee, and the membership in general, for their cooperation during the past three years, as although the work has been considerable, it has been a pleasure, and I bespeak your cooperation for my successor.

Respectfully submitted,

ALEX MORRISON,
Secretary.

President Wood: You have heard the report of the Secretary. What is your pleasure?

Dr. Scott: I move that it be accepted as read.

. . . The motion was duly seconded, put to a vote, and carried . . .

President Wood: We will have a report from the Treasurer, Mr. Davies.

Mr. Davies: I will make my report just as brief as

possible and give you just the significant figures for the year's work.

. . . Mr. Davies then presented his report as Treasurer . . .

Treasurer's Report

For the Year 1931

GENERAL FUND

Cash on hand Nov. 19, 1930		$5,059.65
Receipts Nov. 19, 1930 to Nov. 19, 1931		5,575.64
Interest on Savings Account		265.28
		$10,900.57
Expenditures Nov. 19, 1930 to Nov. 19, 1931	$6,676.62	6,676.62
Balance		$4,223.95

RESEARCH FUND

Cash on hand Nov. 19, 1930		$3,640.00
Receipts Nov. 19, 1930 to Nov. 19, 1931		$2,061.50
From Textile Foundation		3,750.00
		$9,451.50
Expenditures Nov. 19, 1930 to Nov. 19, 1931	$6,592.60	6,592.60
Balance		$2,858.90

BANK BALANCE

General Fund	$4,223.95
Research Fund	2,858.90
Balance	$7,082.85
First National Bank Checking Account	$1,136.36
First National Bank Savings Account	5,946.49
	$7,082.85

Respectfully submitted,
H. R. DAVIES, *Treasurer.*

President Wood: While the Treasurer's report shows a shrinkage in funds we are still not in the red and therefore I think he is to be congratulated on his conduct of the office during the past year.

It is in order for someone to move that the report be accepted and placed on file.

Professor Olney: I so move.

. . . The motion was seconded by Dr. Scott, put to a vote, and carried . . .

President Wood: We have certain amendments here which I will ask the Secretary to read, for your approval.

Secretary Morrison: For the benefit of those who are not wholly familiar with the procedure in regard to amendments I will just read Article XII regarding amendments:

"Proposed amendments to this Constitution, signed by at least ten members, must be presented in writing to the Council at least four weeks before the next annual meeting. In the notice for this meeting the proposed amendments shall be printed. At the annual meeting the proposed amendments may be discussed and amended and may be passed to letter ballot by a two-thirds vote of those present.

"If two-thirds of the votes obtained by letter ballot are in favor of a proposed amendment, it shall be adopted."

So far these amendments have been signed by the ten members and approved by the Council and have been sent to you and today they are simply to be voted by letter ballot. As the hour is late I think it is rather unnecessary to read the individual amendments and corrections. All I will do is simply state that the corrections and changes in Articles III, IV, XV, and XIX are simply to cover the formation of the student membership class. They are just corrections that have to be made in the wording so that we can have this student membership.

The change in Article VII which I referred to in my report, to encourage members who have resigned or been dropped for non-payment of dues to become reinstated, will make the Article read as follows:

"Members whose dues are in arrears on March 1 of any year shall have notice sent them and unless payment is made by May 1 they shall cease to have any rights or privileges in the Association. Such members shall, however, be restored by vote of the Council to rights and privileges of the Association during the fiscal year in which they are suspended by full payment of dues for that year or during any future year by full payment of the money due the Association at the time of their suspension, plus payment of full dues for the year in which they seek reinstatement."

This simply sives the Council a law in black and white by which they can reassess a member who has resigned or been dropped and does not leave them quite so much in the dark as they have been in the past.

I do not think it is necessary to explain these any further but if any of you feel that it is I would be glad to go into it in more detail.

President Wood: Gentlemen, you have had this explained to you quite thoroughly. You understand that this is merely a motion that a letter ballot be sent out. Two-thirds of the votes of the entire membership are required to change the Constitution. What is your pleasure?

. . . Upon motion duly made and seconded it was voted that the amendments be sent out to letter ballot the membership . . .

President Wood: Gentlemen, during the year we have lost several members, amongst them at least two to whom I would like to draw special attention.

Mr. W. K. Robbins was one of the charter members of the Association. He was also very active in the Research Committee and a valued member of the Council.

Mr. Edward F. L. Lotte, a silk dyer, was one of our New York Section members. He was very helpful in the conduct of the work of the Section. He was at one time Chairman of the New York Section and he acted for a great many years on the Research Committee.

I will ask you to rise a minute in respect for these men as I read their names. Will you please rise?

. . . The members arose and stood in silence while President Wood read the names of members who died during the past year as follows:

Cyrus M. Benson
Oakley M. Bishop
L. K. Fackler
J. H. Hindle
Frank E. Johnson
Ed. F. L. Lotte
John A. Meltzer
Todd B. Meisenheimer
A. F. Musgrave
Carl Oberholtzer
Wm. K. Robbins
Richard Rouse
Morris F. Schmidt.

President Wood: Is the Committee on Prize Papers ready to report? Mr. Williams, will you come up and make your report?

Mr. Williams: This Committee has been faced with the usual more or less difficult task of choosing the prize papers for the year 1931. I might say that the Council nominated this Committee when there wasn't one of them present so they didn't have a chance to get out of the job but we want to serve notice right here and now that we have performed this task several years in succession and it is time that a new committee was appointed.

We have decided that the first prize, awarded for the paper containing the most original matter and matter of most value to the industry, should be awarded to the paper on "A New Method for the Evaluation of Wetting Agents," by Dr. Draves and Dr. Clarkson. That appeared in March, 1931.

The second prize we awarded to a paper, "Some Unusual Reactions of Cellulose," by Dr. Walter M. Scott.

The third prize was awarded for a paper, "Dyeing Silk Hosiery," by Noel D. White.

The fourth prize was awarded for a paper, "The Process of Silk Soaking," by Dr. Foster Dee Snell and Cyril S. Kimball. (Applause.)

President Wood: Dr. Olney, are you ready to report for the Research Committee?

Report of Research Committee

Prof. Louis A. Olney: The Research Committee of the American Association of Textile Chemists and Colorists has just finished the tenth year of its activities.

During this period sixty-nine meetings of the Research Committee have been held with an average attendance of about twenty. When one considers the wide geographical distribution of the members of this committee, and the fact that they are all very busy men, we believe that this speaks well, not only for their individual interest in the affairs of the Association, but also, for the research mindedness of the corporations they represent.

The reports of the Research Committee which have appeared in our Year Books, taken collectively, give a detailed account of what has been accomplished from year to year. It is interesting to note that in our first Year Book published eight years ago, in 1923, only three subcommittees were working, whereas, there will be reported in our 1931 Year Book eighteen sub-committees of the Research Committee, which with the exception of two or three that have completed their work, are still actively engaged in the study of the special problems for which they were appointed.

Since the last Annual Meeting, there have been held eight regular meetings of the Research Committee, and in addition, there have been many meetings of sub-committees and innumerable conferences between committee members upon various phases of their work.

Activities of Sub-Committees

As most of the sub-committees will report directly after these introductory remarks, little need be said at this time in regard to their accomplishments.

During the past year the Sub-Committee on Rayon has been very active and under the chairmanship of Mr. B. L. Hathorne has held numerous meetings and done very creditable work.

The Sub-Committee on Fastness of Dyed Wool has been making extensive studies, particularly in relation to fastness to fulling, an endeavor having been made under the direction of Chairman Hugh Christison to adapt the Launder-Ometer to a satisfactory test to fulling.

The Sub-Committee on Light Fastness, under Chairman Wm. H. Cady, has as usual been very active, particularly along the line of classification of dyed textiles in the standard sunlight exposure tests. Also, in the comparison of the transmission power of different globes in the Fade-Ometer and an examination of the test papers devised by Dr. Paul Krais.

The Sub-Committee on Standard Methods for Determining Sizing and Finishing Materials under the chairmanship of Mr. Russell W. Hook has made considerable progress. The same is true of the newly-formed committee on Materials for the Construction of Dyeing, Bleaching and Finishing Machinery and Apparatus under the chairmanship of Harold W. Leitch, also of the Com-

mittee on the Determination of the Waterproofedness of Textile Fabrics under the chairmanship of Dr. Joseph F. X. Harold.

Other sub-committees have been completing work already started and in a number of instances are about to inaugurate work on new problems. Their reports will appear in the 1931 Year Book.

Publications

Several of the sub-committees have published reports during the year.

Report IV of the Sub-Committee on Light Fastness entitled "Classification of Dyed Textiles in the Standard Sunlight Exposure Test," appearing in the Proceedings as published in the June 8, 1931, American Dyestuff Reporter.

Report V of the Sub-Committee on Light Fastness entitled "Fade-Ometer Tests with a Corex D Globe" appearing in the Proceedings as published in the November 23, 1931, issue of the American Dyestuff Reporter.

Report of the Sub-Committee on Standard Methods of Determining Sizing and Finishing Materials in Textile Fabrics including Silk Weighting, appearing in the Proceedings as published in the October 26, 1931, issue of the American Dyestuff Reporter.

Report of the Sub-Committee on Rayon dealing with Methods of Identification and Recognition of the Different Rayons, published in the Proceedings as appearing in the October 12, 1931, issue of the American Dyestuff Reporter.

There also appeared in the December 7th American Dyestuff Reporter, in the Proceedings, an article by Milton Harris in cooperation with Daniel A. Jessup of the Bureau of Standards entitled "The Effect of pH on the Photo Chemical Decomposition of Silk."

Cooperative Support

Textile Foundation—Nat'l Ass'n Wool Mfgs.—Corporation Memberships

Nearly a year ago the Textile Foundation allocated to the Association towards the work of the Research Committee $5,000.00. This entire amount was used in acquiring two additional Research Associates, one of whom, Milton Harris, has been located at the Bureau of Standards in Washington, and the other, Bertil A. Ryberg, at the Lowell Textile Institute in Lowell.

This valuable assistance of the Textile Foundation has made it possible for us to greatly extend our work, particularly as regards laboratory work, and it is hoped that the results accomplished through this additional support have proved sufficiently creditable to justify the Textile Foundation in not only continuing their support another year, but in increasing it somewhat.

A grant of $500.00 from the National Association of Wool Manufacturers has also assisted greatly in the execution of our work, and it is hoped that this may also be continued another year.

The fundamental source of funds, however, for our research work is through our own Corporation Memberships. Owing to the unsatisfactory condition which has existed during the past year in the textile and allied industries, the proceeds from this source have not increased as much as had been expected. It is sincerely hoped that we shall have continued support of all of our present Corporation Members and that a gradual if not rapid increase may come from this source during the coming year.

I wish to take this opportunity to impress upon you again as I frequently have in the past that any effort individual members of the Association may make in securing additional corporation members is a direct and a valuable contribution to the work of the Research Committee. You may not be able to contribute financially yourself, but if you can secure a corporate membership, of one hundred dollars or more, it will not only secure the interest of the company but will increase your own interest at the same time, and constitute a most tangible contribution toward the work of the committee.

Research Associates and Special Research Projects

We now have three research associates, Wm. C. Smith, Milton Harris and Bertil A. Ryberg. Their time has been divided between work incident to the activities of the various sub-committees and work upon individual research projects. Among those projects which are actively under way at the present time are the following:

Determination of Iso Electric Point of Wool, and a study of woolen mill processing methods with the object in view of correlating these with the fundamental properties of wood fiber—assigned to Milton Harris.

Action of Light on Pure Dye Silk.

A study of the effect of pH on the Photo Chemical Decomposition of Silk—assigned to Milton Harris.

An examination of the Krais test paper for measuring light in fading tests with the object of securing a more direct correlation between our experiments and those being conducted by Dr. Krais—assigned to Wm. C. Smith.

Effect of Acidity and Alkalinity on the Determination of Cotton Cloth on Exposure to Light—assigned to Wm. C. Smith.

Effect of the presence in cloth of iron, manganese and copper salts on the Deterioration on Exposure to Light—assigned to Wm. C. Smith.

Effect of Carbonization on the Dyeing Properties of Woolen Cloth.

A study of the dyeing properties of different classes of dyes upon carbonized woolen material.

A study of the irregularities occuring in Woolen Material Carbonized before dyeing.

A study of the nature of the irregularities or so-called

Resist Spots occurring in Carbonized Woolen Material and their subsequent behavior in dyeing.

All of the above subjects will be considered first in connection with sulphuric acid and later in connection with aluminum chloride.

Standard Dyeings

Four standard dyeings representing Classes I, II, III and IV were accepted at the last Annual Meeting as provisional standards for fastness to washing of dyed silk. These have been prepared in proper form for distribution and are for sale by the Secretary of the Association. These are fully described under the report of the Sub-Committee on Fastness to Dyed Silk. It might be of interest to note that a number of these standards have already been sold, one going to Russia, one to Japan, and another to China.

Future Plans

It is the intention of the Research Committee to continue the preparation of standard dyed samples until all of the Association's standard classifications of fastness of different fibers both to light and washing have been completed. Now that the various washing tests have been more completely adapted to the Launder-Ometer, it is the plan to provide these standard samples with as great rapidity as may be practicable with the funds which are available.

The Association will also undertake as rapidly as may be possible the classification of the most important dyestuffs in accordance with the Association's standards for fastness to all color-destroying agencies, this work to begin with the more important and extensively used dyes and eventually extending through the list of those which have been classified. The object of this work is to make it possible to determine the fastness of the more important and commonly used dyes in terms of the standards of the Association by reference to printed tabulations. It is particularly desirable in connection with this latter work that an international agreement be formulated as early as possible.

In closing this report the Chairman wishes to express his personal appreciation of the loyal support and co-operation which have been given at all times by the Chairmen of the Sub-Committees, as well as the individual members on the numerous committees, all of whom have contributed so generously of their time and efforts towards the advancement of the Association's research work.

Some of the Sub-Committees have short reports to make and in some instances resolutions to offer in regard to the methods which they have worked out. It will not take a great while to go through these.

The first one is the Sub-Committee on Fastness Tests for Dyed Silk, of which Dr. Scott is Chairman.

Sub-Committee on Fastness Tests for Dyed Silk

Dr. Scott: I think I can make this report very brief.

The report consists chiefly of a resume of accomplishments and recommendations to the meeting. The committee has published in the Year Book for several years without change standard tests for fastness to washing of dyed silk and recommendations for classification of this fastness with respect to washing.

So far as the Committee knows there has been no criticism of these methods of testing and methods of classification and as Chairman of the Committee I want to, at the present time, make the recommendation that the Association adopt these tests and methods of classification as standard, the adoption to be of tests as published in the 1930 Year Book on Pages 89, 90, and 91.

The second angle of the Committee's work, the preparation of standards which will be representative of the classes of fastness, the Chairman of the Research Committee has already spoken to you of. We have prepared these standards which have been tentatively adopted and the reason the Committee is not at present recommending their final adoption is that there has been some criticism of the spacing of one or two of these standards. The Committee therefore in order to get a consensus of opinion of our membership urge the members to make more use of these standards and to send to the Committee further criticism of them, if there are such, or recommendations for procedure in making the standards more usable, and the Committee itself hopes as soon as that matter is cleared up to be able to recommend permanent standards to you for final adoption.

President Wood: Is this recommendation seconded? . . . The recommendation was duly seconded . . .

President Wood: It has been moved and seconded that the tests as outlined in the Year Book be adopted as standard by the Association. Is there any discussion? If not, all those in favor say "aye," contrary "no." It is a vote.

Prof. Olney: Sub-Committee on Fastness Tests for Dyed Wool, Hugh Christison Chairman.

Sub-Committee on Fastness Tests for Dyed Wool

Mr. Christison: Actual work began with attempts to prepare two felt pads simultaneously in the Abbott laboratory felting machine. This could not be done satisfactorily, so pads were made singly.

Portions of quarter-blood scoured wool were dyed with six different dyestuffs selected to show different behaviors in fulling tests. The dyed wool was carded and made into felt pads. There were some indications that long dyeing processes, especially with Chrome, and excessive working of the wool during dyeing, caused it

to have poor felting qualities. Two pads prepared from each of the six portions of dyed wool were sewn together, forming a bag in which had been placed a small piece of cotton, wool, and silk union material and four ¾" steel balls. These bags were tested in the Launder-Ometer, at different temperatures and with neutral and alkaline soap solutions. A series of such tested samples were prepared and examined by all members of the Sub-Committee.

Since pads strong enough to last in the Launder-Ometer were difficult to prepare, the idea of incorporating the union material used, into the pad during its manufacture, was tried out. This greatly strengthened the pads. Several series of tests were made upon pads strengthened by the union material. Sticking of samples in the jars was encountered when a high titer soap was used. To overcome this, one large steel ball was tried out in place of four smaller. It proved unsatisfactory.

The idea of using a heavy coarse knitted tubing in place of felt pads was suggested by Mr. Christison. It was thought that if this was found satisfactory, it would eliminate the felting machine altogether, which would be advantageous.

Several sizes of knit tubing were made for experimentation. They were made of various sizes of yarn. These tubes were scoured and dyed, cut into three inch lengths and one end sewed together. Inside of each of these tubes were placed four ¾" steel balls and a small piece of union material, and the open end was then sewn together.

After several series of tests, a tube one and five-eighths inches in width, made of one-quarter blood yarn size 2/8s with a low twist, was found to give the best results. The use of knit tubing proved much superior in every way to felt pads.

The Sub-Committee, unanimously agreed to discard felting machines entirely because the knit tube proved to be a considerable time saver. Mr. Ryberg, the associate conceived the idea of using tinned staples in place of sewing, on the ends of the test samples. This also is a considerable time saver. This knit tubing can be easily manufactured, dyed, and prepared for fulling tests. There is a very good felt produced, comparable to actual mill fulling.

The knit tubing approved by the Sub-Committee, as a vehicle for fulling tests, was used in a large series of tests of thirty-three separate dyes, selected by the Sub-Committee in an attempt to select standards. These test samples were examined by the Sub-Committee and it was found that the set of conditions used in these tests were too severe.

Mr. Ryberg, the associate who has been working with the committee then began a series of tests on two dyestuffs involving three different sets of conditions, (1) varying the temperature, and keeping speed and soap concentration constant; (2) keeping the temperature and soap constant, and varying the speed of the Launder-Ometer; (3) holding the temperature and speed constant, and varying the soap concentration. All of the above tests were carried out varying the time intervals also.

In order to have a standard of comparison, a series of samples prepared similarly as for Launder-Ometer tests, except for the steel balls, were distributed to three different mills, there to be put thru an actual mill fulling. These have not been returned at the present moment.

Since all possible variables have been investigated, it is hoped that a set of standard conditions will soon be selected, as well as dyestuff standards, for each class of fastness.

Prof. Olney: Sub-Committee on Fastness Tests for Dyed Cotton, George A. Moran.

Sub-Committee on Fastness Tests for Dyed Cotton

Mr. Moran: Since the last Annual Meeting no work has been done by the Sub-Committee on Cotton Fastness because the methods were considered satisfactory and standard at that time. Recently there has been raised by a representative of the consuming public the question regarding tub-fast colors. This represents quite an important line in the cotton business. These colors are sold as tub-fast. They may or may not be fast to light but they do possess apparently satisfactory fastness to washing. They are usually dyed grounds, that is, dyed backgrounds, with printed designs, usually vat colors. They would naturally come under Test 2 of the fastness to washing tests. When subjected to this particular test they stand up very well as regards alteration in shade, usually going down but very slightly, but they do in many cases stain white cotton somewhat so that they do not pass this test perfectly and it seems desirable that a test should be arranged that this particular class of colors would pass satisfactorily. So it is planned to take this matter up in the immediate future and try to made a modification of Test Number 2 that will cover this class of work satisfactorily.

With that I think the work of this Sub-Committee will be completed, except as regards actually dyeing up the necessary standards which will also be taken care of in the near future.

Prof. Olney: Sub-Committee on Fastness to Light, Mr. Cady, Chairman.

Mr. Cady: Mr. Chairman, the time is getting very short and this report has nothing in it which requires discussion so I suggest that it be printed without being read here.

Sub-Committee on Fastness to Light

Standards of Light Fastness. Your committee has tentatively selected six dyes, all for wool, which seem to possess the necessary qualifications for a series of standards, ranging all the way from very fugitive to very fast. These six dyes, and the percentages employed in preparing the standard dyeings, are as follows: Class 1, 2% Indigotine Conc. (C. I. 1180); Class 2, 1.5% Scarlet 2R (C. I. 79); Class 3, 2% Amaranth Ex. Conc. (C. I. 184); Class 4, 3% Azo Acid Red B (C. I. 54); Class 5, 2.5% Diamine Fast Red F (C. I. 419); Class 6, 6% Indigosol O (C. I. 1177). When these six dyeings were exposed either to our standard sunlight test or in the Fadeometer, the Class 1 dyeing faded rapidly; the Class 2 dyeing required just about twice as long an exposure as the Class 1 dyeing to obtain the same amount of fading; the Class 3 dyeing was likewise just about twice as fast as the Class 2 dyeing; and so on through the higher classes, until the standard for Class 6 was hardly faded at all even after prolonged exposure. In every case the fading was clean-cut, and each period of exposure showed a distinct contrast when compared with a longer or shorter period. It is interesting to note that every one of these dyes was included in the list of standards for wool recommended by the German Echtheitskommission in 1928, but the order of fastness is not quite the same. We have already submitted dyed samples of these tentative standards to several laboratories with a request for a practical trial, and it is our intention to distribute still other sets at an early date. Whether these standards will be definitely recommended by us for adoption will depend on the reports we receive from these preliminary trials.

Classification of Dyes. Our report on the relative fastness to light of 1196 dyeings, representing 366 different dyes, was published in the Dyestuff Reporter June 8, 1931. This report has been adversely criticised by several dye firms on the ground that their products were not sufficiently represented in the list, and that certain individual dyes were classified incorrectly. As to the former criticism, it should be understood that the dyes employed in this investigation were selected because they represented certain particular types which we desired to test, and the question as to who manufactured them did not especially interest us. But with regard to possible errors in the classifications, we hope that anyone who has any criticisms to make will kindly send them to the Chairman of this Committee as soon as possible, in order that they may be investigated.

Corex Globes for the Fadeometer. Our Research Associate, William C. Smith, has studied the effect of substituting globes of Corex glass for the ordinary glass globes that have been supplied with Fadeometers in the past, and finds that there is no appreciable difference in the results obtained with these two glasses. His report, giving full details, was published in the Dyestuff Reporter Nov. 23, 1931, page 754.

Krais Test Papers. Dr. Paul Krais recommended sometime ago the use of a paper coated with Victoria Blue B precipitated on China Clay as a suitable material for measuring sunlight in fading tests. (see Dyestuff Reporter, Jan. 5, 1931, page 31). Samples of this paper were obtained from Dr. Krais and tested by Research Associate Smith at the Bureau of Standards. His conclusions were as follows: the paper is uniform in color, does not change in storage, fades towards white, and is sensitive to small differences in the period of exposure. Samples of the paper were submitted to the Fadeometer and several types of daylight exposure, including our standard sun test, and spectral reflection measurements were made to record the results. It was observed that the amount of fading shown by the paper agreed with the normal fading for dyeings in nearly every case.

Program for the Future. Some progress has been made in trying to determine the relative merits of the English Fugitometer and the American Fadeometer, but more work will be necessary before we can reach any conclusions. One field which has not yet been touched is the fastness of dyes on acetate silk. It would be desirable in the near future to prepare a classification list of the more important dyes on this new fiber. This might lead to an investigation of "phototropism" and the publication of a list of dyes which show this defect. In closing, we would refer again to the subject of "abnormal fading" which was emphasized in last year's report (where the fastness of one dye is affected, for better or worse, by the presence of another dye in the same combination). We shall be glad to receive reports of any unusual instances of this sort, as it is hoped to make a systematic study of this whole subject when opportunity permits.

WILLIAM H. CADY,
Chairman.

Prof. Olney: Committee on Method of Testing Waterproof Textiles, Dr. Harold.

Sub-Committee on Method of Testing Water-Proofing Textile

Dr. Jos. F. X. Harold: The Committee has very little to add as to its year's work except that it intends to include in the new Year Book, if it meets with general approval, the box test devised by the Bureau of Standards in connection with which Wm. C. Smith, our Research Associate, has been doing considerable work. It feels that with certain adaptations the box test as there devised can be made much more applicable to outdoor tests, with wind pressures and while not as well adapted as the present method to the testing of light or thin fabrics, or fabrics in garment form, still it has advantages and the Committee intends to include it in the Year Book, that is, the so-called "box test" of the Bureau of Standards.

Prof. Olney: Sub-Committee on the Determination of

Minute Quantities of Metals in Fabrics, Dr. Rupp, Chairman.

Sub-Committee on Determination of Minute Quantities of Metals in Fabrics

Dr. Raphael E. Rupp: In the last issue of the Year Book we published methods for small amounts of copper and manganese. Since that time it has developed that every laboratory that is interested in these small quantities has its own particular method which it believes is better than any of the other methods.

In view of this, by cooperating with a committee from the American Society for Testing Materials we have collected the different methods that are in the main dissimilar and along with these sent out samples of cloth containing standard amounts of copper, so the different laboratories may analyze them not only by their own method but by the other methods as well. When these are complete, we expect to have further information on the limitations of the different methods.

Prof. Olney: Committee on Color Standardization, Dr. Scott.

Sub-Committee on Color Standardization

Dr. Scott: I will report very briefly that the Committee on Color Standardization in the 1930 Year Book published a bibliography on articles along this line which we thought would be of interest to members of the Association. That covered all the articles up to date of publication of the Year Book. The Committee plans in the new Year Book to include such articles as have been published during the current year which we think might be of interest to the members of the Association.

Prof. Olney: The next committee is the Sub-Committee on Standard Methods of Determining Sizing and Finishing Materials in Textile Fabrics, including Silk Weighting. Mr. Russell W. Hook is Chairman of that Committee. I do not see him here so I will say just this: In the last issue of the Proceedings you will find the results of analyses carried out by five different independent laboratories using the methods which have already been proposed by this Committee and it is quite interesting to note that the results compare very favorably which we believe indicates that the method is practical.

This Committee invites criticism of the methods they have already proposed.

The next committee is the Committee on Shrinkage of Textiles, Mr. Howard D. Clayton, Chairman.

Sub-Committee on Shrinkage of Textiles

Mr. Howard D. Clayton: We have a tentative method for the determining of shrinkage in cotton piece goods and in silk piece goods that we wish to propose. This method is based on the knowledge that the shrinkage of textiles takes place in the wash-wheel, and if we are going to determine standard methods for determining shrinkage it should be something that approximates as nearly as possible the standard laundry practice. This method while not a scientific laboratory method in any sense is a practical method that can be used as a comparison with the laundry shrinkage.

The method is as follows:

On a sample approximately twenty inches long and the full width of the goods mark off accurately eighteen inches in both warp and filling directions using an indelible ink which will not wash out during the laundry process. The sample is put into a small wash-wheel of the cylindrical type such as is used in laundries and given a five-minute rinse in water at ordinary temperature. After the five-minute rinse the water is drawn off and water at 140 degrees Fahrenheit is added and sufficient soap to give a good running suds.

The sample is run in the soap wash for thirty minutes and at the end of that time the soap is drawn off and a ten-minute rinse in water at 140 degrees Fahrenheit is given, followed with two five-minute rinses, each time drawing off the previous rinses completely before adding fresh water. A similar five-minute rinse with water containing about one-eighth of one per cent of fifty-six per cent acetic acid is given.

This is done to thoroughly neutralize any small traces of soap which may be remaining in the goods. The samples are then squeezed by hand without stretching and placed on a screen and dried in a suitable dry room.

After drying, samples are dampened slightly with a spray of water and pressed with a hot iron. During the pressing care should be taken not to iron the goods with a sliding motion of the iron as is customary in hand ironing but simply press out and smooth the cloth without stretching. The manner of ironing should simulate the action of a laundry press such as is used in custom laundries. This method, including the drying, dampening and ironing should be repeated and the marked off portions on the samples then accurately measured and the results determined in percentage or in inches per yard, as desired. This method is applicable to all fabrics used in garments which are ordinarily washed in a wash-wheel.

The tentative method for silk fabrics is very similar.

A sample of the silk to be tested of any convenient size available, preferably the same size as specified for the cotton cloth method, is marked off accurately in both warp and filling directions and washed for one-half hour in a wash-wheel with a good running suds made from neutral soap at a temperature of not over 100 degrees Fahrenheit. The cloth is rinsed with two five-minute rinses in luke warm water from 70 to 100 degrees and the excess water squeezed out carefully by hand, the sample dried on a screen in a dry room, dampened with a spray dampener, and pressed with a moderately hot iron in the same manner as described for the test on cotton fabrics.

I recommend that these two methods be tentatively adopted by this Association.

. . . The motion was seconded by Dr. Scott, put to a vote, and carried . . .

Prof. Olney: Sub-Committee on Rayon, B. L. Hathorne.

Sub-Committee on Rayon

Mr. Hathorne: The first report of the Committee was published in the AMERICAN DYESTUFF REPORTER October 12th. We have very little to add to that report except that we do want to include in the Year Book this year, if the Committee thinks it advisable, a table giving all of the rayons under their type name, denier, and filament count because that is quite necessary if one wants to identify rayon back to the company.

Also we have considered determining the fastness of dyestuffs on rayon and we could see no reason why we needed a new series of tests. Those for cotton, wool, and silk are quite all right for rayon.

We have prepared a paper that I don't think it necessary to read here. We have simply prepared an outline stating which of the specific tests already in use for cotton, wool and silk should be used for various rayon and rayon-containing fabrics.

I should like to propose that those methods be adopted and published in the new Year Book, and see what happens. If it is in order I will put that in the form of a motion.

President Wood: It is irregular but I think we can overlook that.

Mr. Hathorne: I propose that the method for determining the fastness of dyestuffs on rayon be published tentatively, the method to be similar to the methods of testing dyestuffs on silk, cotton and wool which have already been published.

. . . The motion was made, duly seconded, put to a vote, and carried . . .

Prof. Olney: Committee on Wetting Out Materials—Dr. Draves is chairman of that. I believe he has a proposal.

Committee on Wetting Out Materials

Dr. Draves: Since the publishing of the article last spring on a new method for determination of efficiency of wetting agents, the Sub-Committee hasn't done any new laboratory work. We have merely awaited the experience of other laboratories.

Since other laboratories have reported that the method seems satisfactory, I move that the method as published in the Proceedings of our Society be adopted as a tentative method so that this year we may be open to criticism and changes if necessary.

. . . The motion was seconded by Dr. Scott, put to a vote, and carried . . .

Prof. Olney: There is just one more committee that we would like to hear from. That is the Committee on Materials for the Construction of Dyeing and Finishing. I would like to hear from Mr. Leitch if he is here and has anything to say. (Mr. Leitch was not present).

In closing there is just one more word I would like to say.

It has been recommended that we have a Sub-Committee on Standard Analytical Methods as Adapted to Textile Work. The agricultural chemists, as you may know, have for a great many years had official methods relating to their particular analytical work and we believe that certain methods of an analytical nature of great value to the textile chemist could be standardized and worked out. This is one of the things we have in mind for the coming year.

That is all, Mr. President.

President Wood: Thank you, Professor Olney.

The next business is the report of the tellers. The chief teller is here with us, Mr. Hadley, and we will ask him to make his report on the results of the election.

Mr. Hadley: The total number of votes cast was 468. They were cast as follows:

President—P. J. Wood	440
Vice-President:	
Alex. Morrison	354
W. H. Cady	290
A. R. Thompson	162
Carl E. Bick	90
Secretary—A. Newton Graves	448
Treasurer—H. R. Davies	447
Councillors to serve for three years:	
Wm. R. Moorhouse	256
W. M. Scott	210
Carl Z. Draves	205
R. S. Wheeler	165
H. M. Chase	1

This report, signed by me as Teller, indicates that P. J. Wood and H. R. Davies are re-elected as President and Treasurer, A. Newton Graves as Secretary. Alex. Morrison and W. H. Cady are elected Vice-Presidents, W. R. Moorhouse and W. M. Scott are elected Councillors for three years.

President Wood: Gentlemen, you have heard the results of the election.

As far as I am concerned I am reminded of a story of a school teacher who was explaining to her pupils the significance of color.

"For instance, white," she said, "signifies joy and black signifies mourning."

Illustrating further the application of white she said, "You will remember, children, that the bride is always dressed in white, signifying that she is full of joy, that being one of the happiest days of her life."

At that one little fellow put up his hand and said, "Why is the bridegroom always dressed in black?" (Laughter.)

While I am not dressed in white, neither am I dressed in black, but I want to say this is one of the happiest days of my life and I thank you for the note of confidence exhibited by the result of the election as far as I am concerned, and I shall be most happy to serve the Association in the same capacity during the coming year.

I would like to ask the elected officers to please stand up so that you may all see who they are.

. . . The newly-elected officers arose . . . (Applause.)

President Wood: The meeting, unless there is further business, will now stand adjourned until two-fifteen.

. . . The meeting thereupon adjourned at one-fifteen o'clock.

SEVENTIETH MEETING OF THE RESEARCH COMMITTEE

THE Seventieth Meeting of the Research Committee of the American Association of Textile Chemists and Colorists was held at the Hotel Statler, Boston, Mass., December 4th, 1931.

The following were present:—

Chairman, L. A. Olney
Wm. D. Appel
Wm. H. Cady
Hugh Christison
Howard D. Clayton
Ralph F. Culver
Harry R. Davies
Dr. Carl Z. Draves
Robert H. Gaede
Henry D. Grimes
Walter E. Hadley
Dr. Jos. F. X. Harold
B. L. Hathorne
Henry F. Herrmann
Dr. E. H. Killheffer
Harold W. Leitch
Wm. R. Moorhouse
George A. Moran
Dr. Hans Meyer
Dr. D. H. Powers
Dr. Robert E. Rose
Dr. R. E. Rupp
C. G. V. Sjostrom
A. R. Thompson, Jr.
R. S. Wheeler
Walter S. Williams
P. J. Wood
Alex. Morrison, *Secretary*.

The Chairman opened a discussion on the advisability of forming a new sub-committee to carry on work of particular interest to southern members, the majority of the committee to be southern members. Various problems were discussed.

The Chairman was empowered to appoint such a sub-committee and problems at his discretion.

A lengthy letter and program from the Scientific Research Institute of the Textile Industry of U. S. S. R. (Russia) was read. They desired copies of our Proceedings, etc., and it was voted that the Chairman write to them and offer our Year Book, Proceedings, etc., in exchange for similar material of theirs.

A letter from Dr. Paul Krais of Germany was read, in which he stated that he hoped to make satisfactory proposals for alterations of the printed reports of their Fastness Commission in regard to fastness to light standards along lines brought to his attention by our Light Fastness Committee.

The Chairman reported on his visit to Mr. Franklin D. Hobbs, Chairman of the Trustees of the Textile Foundation, to present the Association's request for further financial aid, and reported progress. Official acknowledgement of the request has been received and the Trustees will consider it at the next meeting.

The remainder of the meeting was given over to the reviewing of reports of the various sub-committees to be presented to the members at the Annual Meeting.

The meeting adjourned at 5:30 P. M.

Respectfully submitted,

ALEX MORRISON,
Secretary.

SEVENTY-SEVENTH COUNCIL MEETING

THE Seventy-Seventh Council Meeting of the American Association of Textile Chemists and Colorists was held at the Hotel Statler, Boston, Mass., December 4th, 1931 at 1:45 P. M.

The following were present:

President: P. J. Wood.

Vice President: Wm. H. Cady.

Councillors: Wm. R. Moorhouse, George A. Moran, Ralph Culver, Walter M. Scott, Hugh Christison.

Councillors ex-officio: H. D. Grimes, Chairman Northern New England Section.

Robert H. Gaede, Chairman, New York Section.

Dr. Robert E. Rose, representing C. H. Seibert, Chairman, Philadelphia Section.

A. R. Thompson, Jr., representing Chairman, Piedmont Section.

R. S. Wheeler, Chairman, South Central Section.

Prof. L. A. Olney, Chairman, Research Committee.

Secretary: Alex. Morrison.

Letter from Vice President H. A. Barnes expressing regret at inability to attend was read.

The report of the last meeting was read and approved.

The Secretary's balance sheet was read as follows and approved:—

Secretary's Balance Sheet—December 1, 1931

Cash on Hand Oct. 4, 1931		$217.68
Receipts Nov. 5 to Dec. 1, Incl.:		
Applications 12 @ $5.00		60.00
Dues, 1 Reinstatement		1.66
Dues, 398 @ $5.00 1 @ $5.50		1,995.50
Corporate Dues		125.00
Year Book Sales 2 @ $3.00		6.00
Reporter Sales		1.00
Howes Publishing Co.—Reporters		2.50
1 Pin		1.50
		$2,410.84
Disbursements:		
Nov. 30, To Treasurer—General Fund	$1,500.00	
Dec. 1, To Treasurer—General Fund	600.00	
Dec. 1, To Treasurer—Research Fund	125.00	
Nov. 11, Exchange charges	.71	
Nov. 30, Exchange charges	.83	
Cash on Hand Andover National Bank	179.30	
Cash on Hand	5.00	
		$2,410.84

The Treasurer's report was read as follows and approved:

Treasurer's Report—December 3, 1931

General Fund

Cash on Hand Nov. 19, 1931	$4,223.95	
Receipts Nov. 19, 1931 to Dec. 3, 1931	2,100.00	
	$6,323.95	
Expenditures Nov. 19, 1931 to Dec. 3, 1931	55.30	
Balance		$6,268.65

Research Fund

Cash on Hand Nov. 19, 1931	$2,858.90	
Receipts Nov. 19, 1931 to Dec. 3, 1931	125.00	
	$2,983.90	
Expenditures Nov. 19, 1931 to Dec. 3, 1931	666.67	
Balance		$2,317.23

Bank Balance

General Fund	$6,268.65	
Research Fund	2,317.23	
Balance		$8,585.88
First National Bank Checking Account	$2,639.39	
First National Bank Savings Account	5,946.49	
Balance		$8,585.88

The following were elected to membership as of thirty days after the publication of their names provided no objections to any are received by the Secretary:—

Active:

Barker, Arthur A.—24 Florence Ave., Holyoke, Mass. Dyer, Farr Alpaca Co., Holyoke, Mass.

Braendly, Oscar—6017 Tulip St., Philadelphia, Pa. Dyer Foreman, Hellwig Silk Dyeing Co., Philadelphia, Pa.

Brothers, W. C.—315 S. Riverside Walk, Pennsgrove, N. J. Superintendent, Azo Color Dept., E. I. du Pont de Nemours & Co. Dye Works, Deepwater Point, N. J.

Dewing, Warren M.—14 Michigan Road, Worcester, Mass. Dyestuff Salesman, General Dyestuff Corp., 159 High St., Boston, Mass.

Farr, Leonard S.—40 Fairfield Ave., Holyoke, Mass. Asst. Supt., Farr Alpaca Co., Holyoke, Mass.

Hefti, Samuel J.—240 E. Delaware Pl., Chicago, Ill. Western Representative, John Campbell & Co., 230 N. Canal St., Chicago, Ill.

Marsson, Rudolph W.—324 Rose St., Freeport, L. I., N. Y. Textile Colorist, General Dyestuff Corp., 230 Fifth Ave., New York, N. Y.

Moyer, Walter J.—Chadwicks, N. Y. Boss Dyer, Utica Willowvale Bleaching Co., Chadwicks, N. Y.

Patzke, R. H.—130 Walker St., Manchester, N. H. Dyer, Cole's Dry Cleansing, 953 Union St., Manchester, N. H.

Stolz, Leroy G.—7th and Elnore Ave., S. Temple Berks Co., Pa. President and Manager, Wm. G. Stolz Sons, Inc., Butler St. and Belt Line R. R., Reading, Pa.

Junior:

Schneider, Arthur E.—119 Massachusetts Ave., Springfield, Mass. Chemist, Ludlow Mfg. Associates, Ludlow, Mass.

Associate:

Henckel, Fred G.—Salesman-Demonstrator, Jacques Wolfe Co., Passaic, N. J. 5736 W. Oxford St., Philadelphia, Pa.

Amos K. Hobby, who had resigned some time ago, was voted reinstated.

The transfer of 25 Junior members to Active membership was ratified.

Alex. Morrison was appointed Asst. Secretary to carry on secretary's duties incident to preparing material for the new Year Book, which necessitates his holding the secretary's files, and until such time as they can be turned over to the new Secretary.

A letter from E. W. Morgan, Chairman of the Mid West Section was read, inviting the Council to bear in mind that that section desires to have the Annual Meeting in 1933 in Chicago, and that a formal invitation would be forthcoming next year. While no definite action has been taken on this matter, the Council have tentative plans in mind to hold the 1933 meeting in Chicago.

A letter from Mitsui & Co., Ltd. of New York, inquiring on behalf of the Textile Association of Japan in regard to procuring our publications, was read. It was voted that the Secretary write to them suggesting a Corporate Membership for the Japanese association, and if such is taken that our Association will give them all back numbers of the Proceedings for their files.

There was a continuation of the discussion started at the last meeting in regard to more careful editing of papers. The President was instructed to write to the Local Secretaries to get competent stenographers and to get adequate reports; if necessary, expense to be borne by the Howes Publishing Co. All papers and reports are to be sent the Secretary of the parent association and then transmitted to different examining editors for corrections and changes before being sent for publication. These editors will probably be the Research Associates.

A. R. Thompson, Jr. placed before the meeting the matter of arranging to have delegates from the various sections sent to the Annual Meetings. Various ideas were expounded, and it was voted that the President appoint a committee to work out a way and means to finance delegates to attend Annual Meetings, the committee to report back at an early Council meeting.

The meeting adjourned at 3:00 P. M.

Respectfully submitted,

ALEX MORRISON,
Secretary.

The Use of Soap in the Textile Industry*

By **BENJAMIN LEVITT**
Consulting Chemist

DETERGENCY in textile manufacture is a very important phase of the business, for without soap no fiber can be made clean enough for good dyeing.

In the case of silk, soap is used not only as a detergent, but as a softener and lubricant. In the soaking bath, for the raw silk, an emulsion of soap and oil is used to soften the gum, but it must not remove it. Naturally such a soap should be neutral. In making such emulsions, we find throwsters using a small amount of alkalies. Mixtures of bicarbonate and carbonate, so-called modified soda, trisodium phosphate, borax and so on. These alkalies are thought to impart added hygroscopicity to the silk, but it is more probable that they saponify the free fatty acids of the oils used, and so make the emulsion that much richer in soap. Then, too, the alkali neutralizes any acidity that there may be in the silk itself, thereby helping to sustain the emulsion.

Olive oil soap solutions are used to lubricate the silk fiber in back-winding, because such solutions do not congeal as quickly as those made with soaps of a harder nature.

For boiling off silk hosiery and degumming, olive soap with and without alkalies has been found most satisfactory, because this soap leaves no odor on the fabric, and washes out completely in cool water. Caution should be used in connection with the amount of alkali in the boil-off, for an excess causes damage to the fabric.

The boil-off soap liquor or gum soap liquor as it is called, is used as a buffer with acid dyes to prevent the color from going onto the fabric too rapidly, and so to promote level dyeing. Care must be exercised to get the proper pH level so as not to break the emulsion and liberate the fatty acids of the soap. It has been found that a pH below 4 is best. Here I must tell you a story—

I once investigated a complaint of a dyer about a shipment of soap. He said that his gum soap liquor did not stand up. We asked him to demonstrate his process to us. Consequently he took a bucket of soap liquor and began adding concentrated sulphuric acid to it. When the fatty acids floated on the surface he was still adding acid. If we had not stopped him he would have poured the whole ladle of acid into the solution. However, when he did stop, he stuck his finger into the solution, tasted it and pronounced it the correct acidity. Needless to say, when we repeated the operation using litmus as indicator, the fatty acid did not float out. Here we have a case of a

* Presented at meeting of Philadelphia Section.

man whose tongue had become so calloused to acid that he lost his entire sense of acidity. We have seen such cases in soap factories where the soap-maker cannot taste much less than ¼% alkali.

In the boiling out of cotton, soap and alkalies are used. It has been found that soaps made of tallow give the best results at high temperatures. Cotton will stand much rougher treatment than silk or wool and so a considerable amount of boiling out is done with caustic soda. However, cotton wax is not soluble in alkali, but may be emulsified by alkaline solutions. The addition of soap or sulphonated oil to the boiling out solution is of material benefit since these reagents facilitate wetting out of the raw cotton.

Matthews states that boiling out with cautsic soda removes only small amounts of wax, but that the addition of 5% soap aids greatly its removal.

Cotton yarns are often treated with tallow and other oils, as ingredients of sizing materials to lubricate the fibers for later weaving. These must be boiled out before the cloth can be dyed. Necessarily soap and alkali must be used.

There are also small amounts of nitrogenous matter in cotton which cannot be removed with soap alone. Caustic soda and bleaching liquor seem to be most effective in this case.

Pectin is another impurity in cotton which is easily removed in alkaline solutions. However, if this is not entirely removed from the fabric in the alkaline solution, it may be re-precipitated on the cotton, on acidifying.

Wool is about the most heavily soiled of all the fibers with which the textile man has to deal. The raw wool may contain considerable dirt, grease, suint, blood and almost anything that the animal may have come in contact with, and hence it comes to the mill in a very dirty condition.

To counteract acidity which is always present in raw wool, soda ash or pearl ash is used together with soap to clean it. The proper condition of alkalinity must be maintained in the bowl, in order that the soap may be kept active. However, too great an amount of alkali must be avoided lest the wool be discolored or even dissolved.

The soap preferred by many wool scourers is one made of olive oil and potash. It is said that such a soap imparts a soft feel to the wool. However, even though potash soap is specified, we find some of the wool scourers using soda ash instead of pearl ash (Potassium carbonate) in connection with potash soap. They seem willing to pay for potash soap, but cannot stand the added expense of using pearl ash with it.

In wool spinning, oils are used. These consist of lard oil, or lard oil and mineral oil mixtures, and red oil. These must be removed after the goods are woven. Alkalies such as soda ash or alkali and soap are used for this purpose. In many cases where cheap unrefined mineral oils have been used great difficulty is experienced in the emulsification and in their removal.

For fulling, the trade has somehow come to require palm oil soda soap. The reason for this choice is not very well known. We have no doubt that there will be great difference of opinion among you on this point. Some say that softer oils make better soap for this purpose. Still there are tons and tons of palm soap sold for fulling. In the finishing various soaps are again used.

Besides these forms of detergents there are many organic solvents and emulsifiers used either alone or in conjunction with soap.

Carbon tetrachloride, trichlorethylene, chloroform, naphtha, pine oil, benzol, hexalin, tetralin, cresols and numerous compounds of similar nature have been combined with soap to facilitate the removal of oils and greases from textiles. The government has one specification which calls for 12% of a volatile solvent in a liquid soap for laundry use. We believe that this is used to wash horse blankets. Lately soaps of organic amines, such as triethanolamine have been used alone or in combination with other substances and effect emulsification.

We have spoken of soaps, alkalies, emulsifiers. How do they do their work? Let us examine the effect of soap in solution.

When soap is dissolved in water, it undergoes a decomposition in which alkali is liberated in the form of caustic soda, and the elements of water are absorbed. This change is known as hydrolysis. However, by actual measurement, it was found that only a small portion of the alkali in soap is ever found free in solution. Hydrolysis may be demonstrated by the well known test of placing a drop of phenolphthalein solution on a piece of dry soap. No change occurs. If this is repeated using a piece of soap that has been wetted, it immediately turns red.

Present-day investigators attribute both colloid and crystaloidal properties to soap.

There are various theories regarding the cleansing action of soap. Some say that the alkali liberated combines with the fat which holds dirt particles to fabrics. The dirt is then removed mechanically. This, however, is not true in every case, for we may have dirt that adheres to the fabric by means of sticky substances. Then there is the emulsification theory which claims that soiled fabrics are cleansed by virtue of the emulsification of the fatty parts of the stain.

The Brownian theory is another which attempts to explain the action of soap. Here it has been shown that soap increases pedesis or the movement of particles of matter.

It is well known that soap reduces surface tension. With the reduction of surface tension, capillarity is increased. This causes quicker wetting out of fabrics, and consequently a loosening of the dirt particles. There is no

doubt that each investigator can prove his pet theory, and it is our belief that they are all meritorious to a certain extent.

In the last few years, the control of solutions by means of pH tests has become quite general, not only in the laboratory but even on a commercial scale. One of the nicest pieces of mechanism that has come to our attention is the control of neutralizing baths in mercerizing plants, by means of a potentiometer.

The pH strength of many acids and alkalies is now well known, for instance, McCrumb gives the following values for N/10 solutions of these acids:

	pH
Hydrochloric	1.00
Sulphuric	1.20
Phosphoric	1.50
Acetic	2.90
Boric	5.20

Vail finds the values for 1/10% solutions of alkalies as follows:

	pH
Caustic soda	11.8
Sod. meta silicate	11.2
Trisodium phosphate	10.9
Soda ash	10.7
Sod. sesqui carbonate	10.0

We have found that tallow soap which is practically neutral by ordinary method of testing, gave a pH of 9.2. Olive oil soap which had only a trace of free alkali pH 9.7. It is stated that neutral triethanolamine soap has a value around 8.

In conclusion, I would like to suggest that more research be done to discover what soaps are most efficient for various purposes of textile work, for there seems to be a great divergence of opinion as to what is best for this or that purpose. What is good for one dyer may not suit another doing the same thing. Even in processing we find many and varying methods.

The *Textile World* estimates that the textile industry consumes between 25 and 30 million dollars worth of soap annually. This is divided among the various branches of the industry as follows: Wool, 45%; silk, 35%; cotton, 15%; miscellaneous, 5%.

For the soap manufacturer we venture to say that he is willing to supply whatever soap or combination of soap with other ingredients that may be required.

In concluding I would like to mention that I have thought of several debatable matters which I would like to hear discussed:

1—Does the addition of alkali to the silk soaking bath increase hygroscopicity?

2—How strongly alkaline may a boil-off bath for hosiery be and how strongly alkaline may a degumming bath be?

3—How much alkali will raw wool stand?

4—Is palm oil soap best for fulling and is so, why?

Discussion

Mr. Stringfellow: In the dyeing of spun rayon, we have come in contact with some of this material which contained some spinning oil, either oleate or vegetable oil which we found very difficult to remove. To remove it we experimented with various detergents and found the two best to be soap and tri-sodium phosphate and soap and soda ash. In fact, we found the latter to be most efficient. Has the latter a greater detergent value than tri-sodium phosphate alone?

Mr. Levitt: In any combination with soap you will get the benefit of its emulsifying action and soda ash is a stronger alkali than tri-sodium phosphate.

Mr. Stringfellow: Can you tell me what oil is used for spun silk?

Mr. Levitt: No, but probably mineral oils are mostly used. Various throwsters have told me that by using a small amount of emulsified alkali they get greater hygroscopicity. Whether this is due to the increase in the soap content or mainly to the absorption of water by the soap itself, I do not know. Perhaps there is someone present who can throw some light on the subject.

Mr. Knaeble: I am not familiar with oils. Is olive or neatsfoot oil best and is the increase in the hygroscopicity mentioned, due to the presence of glycerine, which we know will increase hygroscopicity? My question is, which is the most suitable for the throwster, an oil with an olive, red or neatsfoot base? I have been told that an oil on the alkaline side is preferable, but that such an oil had a tendency to corrode the knitting needles. Now is there an oil which is neutral and ideal for the throwster?

Mr. Levitt: There are not many oils available which are absolutely neutral, nor many necessities for the use of such oils in conjunction with soap. I have found that a little free fatty acid is not harmful; in fact, it is beneficial, because it helps the soap and alkali to make a better emulsion. A neutral oil is difficult to emulsify. Some sulphonated oils are on the alkaline side, and I understand that for certain purposes such oils are used in soaking silk. Regarding the question of needle corrosion, it is possible that sulphonated oils which are acidic, might do that.

Mr. Seibert: Mr. Martin, how strongly alkaline may a boil-off bath be for hosiery and how alkaline may a degumming bath be?

Mr. Martin: We use in our dyeing, olive oil soap alone. We boil-off and dye at the same time and use 6% of soap. Our degumming is completed in 20 minutes. That is possibly due to the fact that we use American laundry machines. I am not selling or advocating their use, but our ratio of goods to liquor runs only about 8 to 1. We dye and degum in a very short bath, a very concentrated bath. Our machines are very tight and we possibly have much more pressure in our machines, which has a lot to do with

the action of soap and with the small amount of dyestuff we use. Any high grade soap, manufactured by Procter & Gamble, Chas. W. Young, Laurel or others who are making a good grade of olive oil soap, for dyeing and degumming at the same time, contains not over 1/10% of free alkali. Regarding different types of soap or different qualities to be used, I think that should be left to each particular dyer's view.

Mr. Seibert: Do you prefer an olive oil soap to a red oil soap?

Mr. Martin: Without question.

Mr. Seibert: If so, why?

Mr. Martin: In the first place would you prefer olive or red oil on your salads?

Mr. Seibert: Assuredly the olive oil, but what is your reason?

Mr. Martin: Rancidity has a lot to do with it.

Mr. Seibert: Is the possibility of a red oil soap developing rancidity greater than that of an olive oil soap?

Mr. Martin: I would answer yes.

Mr. Seibert: Is it possible that the reason may be in the manufacture of the soap?

Mr. Martin: We do not think so.

Mr. Seibert: Mr. Levitt, is it possible to make a red oil soap that would not become rancid?

Mr. Levitt: The red oil soap will show a greater amount of unsaponifiable matter than an olive oil soap. You will have 5% or more unsaponifiable matter come along with the red oil as it is pressed out, and that has quite a strong odor. The unsaponifiable matter also has a tinctorial value and may discolor the fiber later. The red oil has a higher iodine value and it is likely to oxidize more quickly than olive oil, and I think that this is one of the real reasons they prefer olive oil to red oil, but I think that the textile people use both and some find that they get satisfactory results with the use of olive and some with red oil. It may be a matter of personal opinion, but I do know that red oil has a strong odor that does not seem to disappear when it is made into soap.

Mr. Martin: Mr. Levitt, the requirements of a dyer go much further than the dyehouse. People that buy our goods may have to keep them on the shelves or in a case. Goods that have been dyed with red oil and stored for two to eight months on the shelves, when taken down have an odor which is absolutely discouraging to anyone that would open the box or purchase the material. I think you have explained why.

Mr. Levitt: I know of a concern that makes a very high price hosiery and who use cocoanut potash soap for boiling-off because they are afraid of odors.

Mr. Knaeble: Mr. Levitt, what is your opinion of mineral oil?

Mr. Levitt: The use of mineral oil of the proper quality in conjunction with fatty oil, such as olive or neatsfoot is very beneficial. First the mineral oil acts as a thinner for the other oil and so reduces viscosity and increases spreading power. Besides, I have found that such mixtures make more stable emulsions.

Mr. Knaeble: There are divers opinions as to the most suitable oil for silk.

Mr. Levitt: Yes. Some think that olive is better and there are those who adhere to neatsfoot, with and without mineral oil. A mineral oil that is water white, odorless and tasteless, when used in a soaking oil, will have no deleterious effect on the fiber and will be easily and completely scoured out in the boil-off.

Mr. Donner: Why is it possible to saponify a red oil or oleic acid easier than a neutral oil?

Mr. Levitt: Because red oil contains 95 to 96% free fatty acids.

Mr. Donner: Isn't it true that olive oil foots is more rancid or odoriferous than red oil?

Mr. Levitt: It is true that olive foots has a strong odor, but that is due to traces of sulphur compounds which disappear while boiling the soap.

Mr. Donner: You do admit that red oil is 98 to 99% fatty acids. Then is not soap made from pure fatty acid purer than soap made from olive foots?

Mr. Levitt: The impurities in the foots are entirely removed in the several washes that the soap receives in process of manufacture.

Mr. Donner: The soap contains salt does it not?

Mr. Levitt: It has a small percentage of salt.

Mr. Donner: Is that true of red oil soap?

Mr. Levitt: Red oil soap made by the half-boiled process does not contain salt, however, it would contain all of the unsaponifiable matter of the original oil, and also its bad odor.

Mr. Donner: What are the iodine values of red oil and olive foots?

Mr. Levitt: Red oil is 90 to 95 and olive foots is about 80.

Mr. Donner: Is that a big difference?

Mr. Levitt: Yes.

Mr. Donner: Comparing the two soaps, which will rinse out more easily?

Mr. Levitt: While theoretically red oil soap should rinse easier, the odor is very difficult to remove.

Mr. Donner: I want Mr. Beauregard's opinion as to whether an iodine number of 85 or 90 would materially affect his decision as to what soap he would use.

Mr. Beauregard: From what angle? If you are going to leave soap in there, personally I would prefer olive oil soap.

Mr. Donner: There should be no soap left in the fabric.

Mr. Beauregard: It isn't left in, if it is rinsed out.

Mr. Donner: Then the possibility of becoming rancid is very vague and I doubt whether there is any possibility.

Mr. Beauregard: It depends upon who the manufacturer is (Laughter.)

AMERICAN DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

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Wishing our readers the best of what the New Year will hold.

A SULPHONATED OIL ASSOCIATION

THE announcement contained elsewhere in this issue of the organization of the Sulphonated Oil Manufacturers Association should be hailed by the textile chemical fraternity with considerable satisfaction.

Among the objectives of the Association set forth is, "To simplify and standardize by nomenclature and method the various processes and measurements used in buying and selling sulphonated oils."

The announcement also states that it will be the aim of the new Association to co-operate with the Bureau of Standards, the American Association of Textile Chemists and Colorists, the American Leather Chemists Association and all other technical organizations whose aims include the better standardization of products and processes in the industries with which they are affiliated.

There is no doubt that the various methods of testing sulphonated oils which are at present in use are unsatisfactory from the standpoint of both manufacturer and consumer, because of the divergent results obtainable by these methods. Moreover, the textile industry has suffered greatly through misrepresentation by unscrupulous purveyors of sulphonated oils as to the qualities possessed and the results to be achieved by the use of their various products. For these reasons any co-operative action, looking to the better standardization of products and practices in this most important group of textile chemicals, is worthy of wholehearted approbation and support by all elements of the textile chemical fraternity.

The REPORTER wishes the new Association every possible success.

"TRADE TEAMWORK"

IN an address before the Electrical Association of Philadelphia, Dr. Julius Klein, Assistant Secretary of Commerce, made a few remarks in regard to trade teamwork, that we believe will not be amiss if reprinted here. A portion of his address follows.

"The current widespread discussion of remedial business measures has brought out much helpful material as to the merits and shortcomings of varying types of national economic councils, three- or five- or ten-year plans, mass formations of trade associations, and other forms of concerted assaults upon the obstructions that impede our return to better times.

"Whatever program or programs be adopted, either on a national basis or by large groups of trade and industry, it is to be earnestly hoped that every precaution is taken against the stifling of individual initiative and ingenuity which is so imperatively necessary during any period of stagnation as an energizing stimulant to new efforts and new methods. Our experience in past depressions has revealed again and again the value of just such contributions toward the awakening of new life in the sadly tried business body of the nation.

"It is gratifying, therefore, to note that, throughout these recent discussions there has been evident appreciation of the fact that, with every regard for the need for coordination and for full legal safeguards for consumer interests, industry must not be shackeled into the lockstep of uniform mediocrity. Therein, it seems to me, lies the peril of any excessive zeal for "'planned prosperity": it must not be too "planned". The more alert leaders of trade and industry must be in a position to capitalize speedily every commercial opportunity presented by changes in buying power, styles, and social standards, by new technical discoveries, new uses for hitherto waste products, by the never-ending variations (often swift and drastic) in marketing conditions.

"American economic growth is due to no little extent to the eagerness of our trades and industries to cast off archaic practices and costly anachronisms. With all due respect to the obvious values of well-tried processes and time-hallowed theorems, its somewhat heretical slogan has always been 'Tradition is the enemy of progress'.

"What 'councils' or 'plans' are set up, we may, I think, be assured of recognition of the dangers of any obstructions to the opportunities for change. Surely our experience during this hectic postwar period has demonstrated all too plainly that no trade or industry in the country has any divine right to perpetuity. The disasters of the past few years have proved that the fewer King Canutes we have in American business trying to impede the tides of progress, the better for the economic outlook of the nation. Whatever concerted plans are developed, they must be sufficiently elastic, sufficiently removed from excessively bureaucratic restraints (and I am, of course, excepting the necessary legal protection

of the consumer against exploitation) to permit of ample mobility.

"Whatever we may do to insure greater stability and better coordination in business, we should not lose sight of the benefits of competition to the producer as well as the consumer.

"Through most of these recent discussions there has run a theme of increasing appreciation for the value of collaboration among business organizations. The trade association figures in several of these plans as the chief factor in their consummation. In still others some type of carefully devised national strategy is built around the idea of marshalling our widespread business activities into more closely coordinated trade and regional groups. Clearly do we seem to be on the eve of a new era of closer teamwork among the countless elements within the scattered ranks of trade and industry. The grim necessities of the hour have unmistakably driven them to a keener appreciation than ever before of the value of closer collaboration in contending with the new perils of the business struggle.

"One interesting type of these coordinating arrangements has been the so-called 'vertical' combinations comprising all of the elements engaged in passing along the given commodity through successive stages of production and distribution: manufacturers, assemblers, processors, wholesalers, jobbers, retailers, and thus finally into the hands of the consumers. Instances of this vertical cooperation occur in such widely differentiated lines as shoes, notions, cotton goods, lumber, paper, and notably in electrical appliances and household equipment.

"These efforts have certainly aroused a greatly increased consciousness on the part of the interested business groups of their joint responsibilities in the marketing of some great staple commodity. One reflection of this is the vigorous campaigning of several of these trade groups in so-called institutional advertising, where the interests of individual operators or traders have been submerged in the general cause of a wider public appreciation of the merits and even the social value of the commodity in question.

"From the point of view of the consumer one of the contributions of special merit of these collaborative trade bodies is the material reenforcement which they give to the betterment of trade ethics within a given group. What might be called the 'craft consciousness', the 'trade pride', of such a greatly broadened alignment of the better elements in a given trade, closely bound together by the common commodity interest, has unmistakably raised and fortified the standards of business behavior among them. Where perhaps a more narrowly restricted, less conspicuous group might be tempted at times to indulge in dubious practices, the extension of the associations to comprehend many lines of business with consequent wider public contacts, has often suppressed selfish motives and made for a notable strengthening of policies in the interests of the community as a whole, not simply of one or two narrower trade groups."

S.O.C.M.A. TENTH ANNUAL MEETING

The tenth annual meeting of the Synthetic Organic Chemical Manufacturers Association convened at 11:30 A.M., at the Hotel Commodore, New York City, on Thursday, December 10, 1931. President Merz presided.

The following officers were elected to serve for the coming year.

President—August Merz, Calco Chemical Co.

1st Vice President—Dr. E. H. Killheffer, E. I. duPont de Nemours & Co.

2nd Vice President—F. G. Zinsser, Zinsser & Co.

Additional Board Members—E. A. Barnett, John Campbell & Co., R. E. Dorland, Dow Chemical Co., G. Lee Camp, Monsanto Chemical Works, A. L. Van Ameringen, Van Ameringen-Habler, Inc.

The guest speaker was John E. Edgerton, President of the National Association of Manufacturers and of the Lebanon Woolen Mills, Lebanon, Tenn., who spoke to the members on present business conditions.

W. K. ROBBINS

Mr. W. K. Robbins, chief Chemist and Superintendent of Dyeing at the Amoskeag Mfg. Co., died last November 26th.

He was a native of the state of Iowa and graduated in 1878 from the Iowa State College with a B. Sc. degree and in 1880 he received his M. Sc. degree from the same institution. In 1879 he became first assistant in quantitative and organic chemistry at the Massachusetts Institute of Technology, where he taught for three years.

In 1882 he became chemist of the Amoskeag Mfg. Co., and in 1903 was made superintendent of dyeing, which entailed complete supervision of all coloring and bleaching operations. Mr. Robbins has also produced several products which he found necessary. Among them are sulphonated castor oil for alizarine dyeing, extracts, soaps, sizing and finishing compounds, and even sulphur black during the wartime shortage of dyestuffs. At the time of his retirement 5 years ago he had full charge of dyeing, bleaching, finishing, soap making and technical research. He was retained by the company in an advisory capacity until his death.

He was a pioneer in politics as well as in food and health regulations and he served as president of the Unitarian church. He was active in the American Chemical Society, serving as president of the New England Section. He was a charter member of the American Association of Textile Chemists and Colorists. Until two years ago he was an active member of the Research Committee of that association and was the only one who was elected to honorary membership.

An Introductory Study of Textile Microbiology--Chapter IV

By **WILLIAM G. CHACE**

Instructor in Chemistry and Microbiology, Lowell Textile Institute

This is the fourth in a series of articles on Textile Microbiology. The others have appeared in three preceding issues. This brief discussion of the technique of work with pure cultures is intended more as an outline guide, than as a complete description of technique, a subject far too large to be covered in this series.

THE subject of cultures may be divided into two parts: I. Isolation in pure culture; II. Identification. Before either of these may be taken up, however, certain general points must be discussed. This article will deal only with the general methods employed.

It has already been mentioned several times that the air bears, along with dust particles, the spores of many micro-organisms. It is the aim of all the various methods to be described to keep these and other accidental infections from contaminating the cultures under observation.

First, it is necessary to render all glassware, as well as the medium into which the culture is to be introduced, sterile, i.e., free from organisms. This may be accomplished in several ways, e.g., heat, chemicals, ultra-filtration, X-rays, ultra-violet light, pressure, etc. Of these the first two are the only ones we need to consider.

Chemicals

Chemicals have the disadvantage that they prevent further growth as well as killing organisms already present. This is a valuable property where further growth is not desired, but makes sterilization of glassware and media by this method out of the question. Chemical sterilization is used in this laboratory in one way which saves considerable time. The usual method of cleaning up infected material is to sterilize in the autoclave and then wash. The sterilization is necessary as it would be unwise to wash heavily infected material because of the danger of skin infections. This process has been reduced to a single operation by plunging all infected material, plug and all, under strong chromic acid cleaning solution (sodium dichromate plus concentrated sulphuric acid and a little water). This solution kills all organisms and also dissolves agar and removes all material from the tube so that sterilizing and washing up is easily and quickly accomplished in this one operation. One precaution must be noted, this acid is toxic to micro-organisms in very small quantities so it must be very thoroughly rinsed from the glassware before it can be used for further bacteriological work. At least ten rinsings is a safe rule. The glassware is, of course, no longer sterile, but it is clean and the original infection has been destroyed.

Heat

Heat is the most valuable method of sterilization. Heat may be applied in several ways, (1) dry heat, (2) steam under pressure, (3) steam at atmospheric pressure, (4) heat at temperatures below 100° C.

Dry Heat

This method of heating is used for apparatus but very seldom for anything else. A dry heat of 150° C. maintained for 2 hours is usually considered sufficient to kill all micro-organisms, although some laboratories use longer times even up to 5 hours. The material to be sterilized is placed in an oven, usually of special design (Fig. 14) but any oven capable of being maintained at this temperature will serve, raised to 150° C., held at this temperature the required length of time (2 hours or longer) and allowed to cool to 60° C. without opening the door. The cooling to 60° C. prevents cracking of any glass apparatus by sudden cooling.

Another way in which dry heat is used is direct flaming in the flame of a Bunsen burner. This is used for platinum needles, mouths of culture tubes and bottles, and for other purposes where quick fairly complete sterilization is necessary. It is only certain when the object is heated to red heat.

Steam Under Pressure

This is the almost universal modern method of sterilizing. The apparatus to be sterilized is placed in an autoclave (Fig. 15) and the steam allowed to flow out through an outlet until all the air has been replaced by steam. The outlet is then closed and the pressure allowed to rise to 15 pounds. This pressure, maintained for 20 minutes, is sufficient to kill all organisms and spores. The method is quick, thorough, and applicable to glassware and other apparatus and to almost all media. It should be used wherever possible. Its only disadvantage lies in the fact that water is left condensed on apparatus. This is sometimes a disadvantage in quantitative work. Where moisture is undesirable, dry heating in the oven should be used.

Streaming or Flowing Steam

Certain media, notably milk, are injured by the temperature of the autoclave and must be sterilized by heating in flowing steam. This is usually accomplished by

Fig. 14
Hot air sterilizer

heating in the autoclave, but leaving the outlet open the whole time—usually ½ hour. The Arnold sterilizer illustrated in Figure 16 is especially designed for heating in flowing steam. This method does not effect complete sterilization, but it has been found that this may usually be accomplished by heating for ½ hour on three to five successive days. By this method sterilization is complete in almost every case, but it cannot be depended upon as "15 pounds for 20 minutes" can. It is, therefore, wise to set aside any material which has been sterilized this way for a few days to see if evidence of growth appears. Any lots in which such growth shows up should be discarded. The method is never used for apparatus.

Pasteurization

This method is used on materials which are very sensitive to heat. It consists of heating on a water bath at as high a temperature as the nature of the material permits—at least 60° C.—for ½ hour on successive days, 3 to 5 or more, if necessary, until most lots are sterile. The method is not dependable and is only used when absolutely necessary. Material which has been pasteurized must always be tested for completeness of sterilization.

Filtration

Filtration through unglazed porcelain is used with liquids which are unusually sensitive to heat, serums, etc. The method is slow, expensive and, like pasteurization, only used when absolutely necessary. The simplest apparatus for accomplishing ultrafiltration, a Berkfeld filter, is illustrated in Figure 17.

Other Methods

The other methods mentioned above have been used to a small extent for sterilizing but need not be considered here.

Media which are to be sterilized in large quantities must be put in bottles or flasks of oval cross section in order that no portion of the material shall be too far from the outside wall. By using vessels of this type, incomplete sterilization due to the heat not reaching the center is prevented. Erlenmeyer and Florence flasks are not suitable. It is also unwise to pack particles in the autoclave too close together. Some free space should be left around each article. Since the medium will boil when the pressure drops, bottles should never be filled more than 2/3 full.

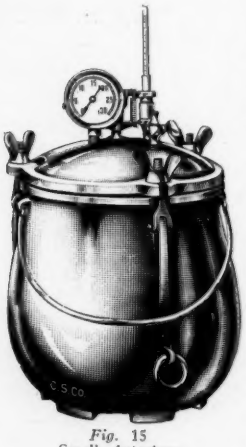

Fig. 15
Small Autoclave

Once the medium is sterilized, it must be kept sterile by preventing the entrance of any organisms. This is accomplished by using a cotton plug. Before vessels of medium are placed in the sterilizer, each is closed with a plug of cotton. Sterile non-absorbent cotton is best for this purpose, although the more common absorbent variety may be used. The author has tried cotton sliver but never with any success. No satisfactory explanation can be offered. A small square of cotton is placed over the mouth of the vessel and pushed down with a pencil or glass rod. A little experience will show what size square to use. The plugs should be tight enough so that a tube containing 10 c.c. of medium can be lifted by the plug.

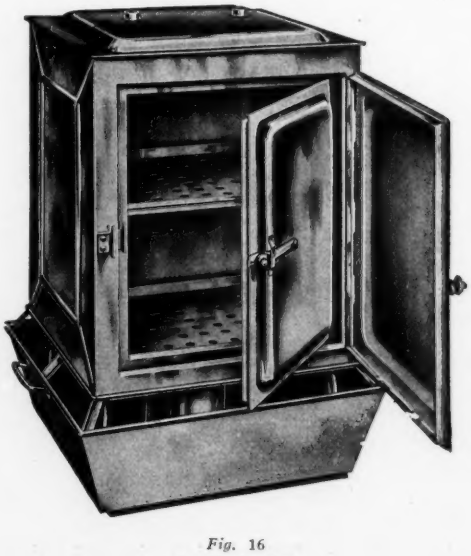

Fig. 16
Arnold sterilizer.

Very little special glassware is needed for microbiological work. Petri dishes are about the only thing. (Fig. 18) Porcelain or glass tops may be used. When glass tops are used, the dishes should be incubated upside down so that any moisture collecting on the top will not drop off

Fig. 17
Berkefield candle.

and spoil the plate below. Test tubes without lips, culture tubes, are desirable but not essential.

The media mentioned above may be prepared by the worker but much time, effort, and probably money, will be saved if they are purchased in the dehydrated form from some biological supply house[1]. Such media are ready for use after adding the required amount of water and sterilizing.

Media are of two general types, liquid and solid. The solid are prepared from the liquid by adding some jelly producing substance like agar-agar or gelatin. Tubes of agar are usually allowed to solidify in a slanted position so that the result looks like Figure 19. This gives much

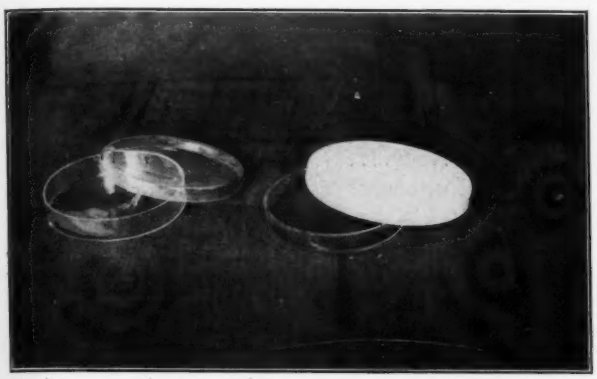

Fig. 18
Petri dishes.

more surface and makes the surface more readily accessible. Tubes of liquid or solid medium should contain about 10 c.c. in tubes ½ by 6 inches.

Bacteria, and mold spores are handled on a platinum wire, called by the bacteriologists a "needle." The technique of transferring from one tube to another is shown in Figure 20. The cotton plugs are withdrawn from the tubes (held as shown in the left hand) with the little finger of the right hand and the mouths of the tubes held for about a minute in a Bunsen flame (flamed). The needle is heated red hot and touched to the agar beside the growth in the tube from which material is to be taken. After cooling the needle in this way, a small amount of

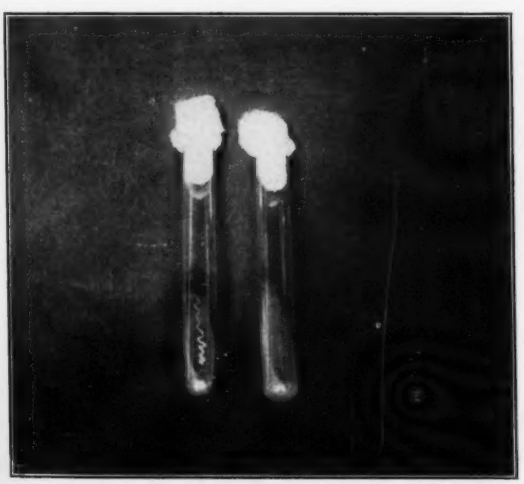

Fig. 19
Agar slants.

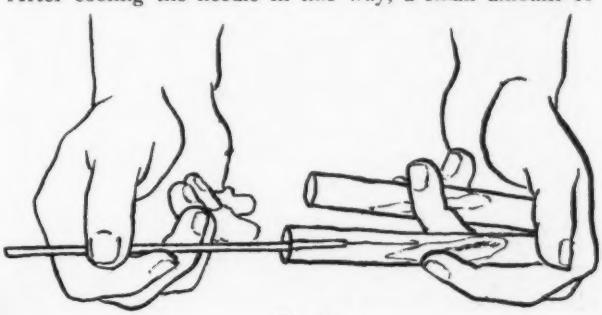

Fig. 20
Transplanting bacteria.

the growth may be scraped up and transferred to the surface of the agar in the other tube. The tubes are flamed again and the plugs inserted. The needle must be flamed before it is laid down. When mold spores are to be transferred, the agar collected by the needle in cooling it will usually make it sticky enough to hold the spores. They do not cling to the needle naturally as bacteria do.

Petri dishes are poured as illustrated in Figure 21. They must first have been sterilized and cooled. The agar is melted in the bottle best by autoclaving. The plug is removed with the right little finger, the neck of the bottle flamed, and the dish filled 2/3 full of melted agar. The cover should be raised only enough to allow the bottle neck to enter. Once they are poured, plates must not be disturbed until they are hard. Once the cover is removed from a Petri dish contamination may enter. Chances of contamination are much less if the dish is inverted whenever it must be opened.

Fig. 21
Pouring Petri dishes.

Gas Tubes

The production of gas by bacteria, particularly in the fermentation of sugars, is frequently a valuable means of distinguishing one bacterium from another. For studying this property, gas tubes illustrated in Figures 22 and 23 are used. The old type (Fig. 22) requires no explanation. It is filled with the medium to be tested and sterilized. The gas collects in the long arm. The

Fig. 22
Fermentation tubes.

illustration shows one tube containing some gas. The type shown in Figure 23 is much more convenient and much less expensive. It consists simply of a regular culture tube into which a smaller tube is inverted. Upon heating in the autoclave, the air, which at first fills the small tube, is driven out and the whole looks like the illustration. In these the gas collects in the small inverted tube inside. These tubes, unlike the others, are easy to clean and many can be packed in a small space.

Fig. 23
Durham gas tube.

For the investigator who may wish to prepare his own media, there is added as a supplement to this section on general technique a list of formulae of various media.

The basic medium of bacteriology is nutrient broth. By adding agar it may be changed to nutrient agar and by adding ½% sugar the various sugar broths are prepared. It is made as follows:

Beef extract	3 gm.
Peptone	5 gm.
Sodium chloride	5 gm.
Water	1 liter

Heat to boiling and filter.

While nutrient broth is the basic medium, nutrient agar is the most valuable. It is prepared by adding 15 grams of washed agar-agar to the broth formula given above.

Nutrient gelatin is prepared by adding 120 grams of gelatin to broth. Gelatin should not be beated any longer than necessary as heat destroys its power of solidifying.

0.008% Neutral red is often added to sugar broths as an indicator to test the acid or alkali producing properties of organisms.

If these media are purchased in the dehydrated form the reaction will be adjusted correctly, but if they are prepared by the worker, they will be so acid that many organisms will be prevented from growing. The reaction must therefore be corrected by titrating with N/10 alkali using phenolphthalein as an indicator and adding the alkali until the solution is a light pink. It is still better to determine the amount of base to add by testing the reaction with a pH apparatus and adding enough alkali to make the whole medium approximately neutral (pH 7).

The media described above are best for bacteria, but not so well suited to the growth of molds. For this latter purpose several special media are in use. English and European workers use malt and prune agar extensively. In this country, however, Czapek's medium has become the standard since it was used by Thom. It is composed of the following materials:

Sucrose	30 gm.
Sodium nitrate	2 gm.
Dipotassium hydrogen phosphate	1 gm.
Magnesium sulfate (crystals)	0.5 gm.
Potassium Chloride	0.5 gm.
Ferrous sulfate	0.01 gm.
Water	1000 c.c.

If this is wanted as a solid medium, 15 grams of agar is added.

Unless a refrigerator or humid chamber is available, all media should be made up in small quantities as they dry up quite rapidly through the cotton plugs.

For a more complete discussion of the various media and the methods of technique the reader is referred to any of the better texts on bacteriology and once again to the works of Thom[3],[4] and Henrici[2].

1. The Difco Laboratories in Detroit make excellent dehydrated media.
2. Henrici, "Molds, Yeasts, and Actinomycetes", John Wiley & Sons, New York, 1930.
3. Thom and Church, "The Aspergilli", Williams and Wilkins, Baltimore, 1926.
4. Thom, "The Penicillia", Williams and Wilkins, Baltimore, 1930.

(Cuts of laboratory apparatus furnished by the Central Scientific Company, Chicago.)

Dyes and Textile Chemicals in Czechoslovakia

Czechoslovakia, a highly industrialized country, possesses one of Europe's oldest textile industries. In order to give a more complete picture of the market for dyes and textile chemicals provided by this industry, a summary of the manufacture of textiles in Czechoslovakia is first given. About 27 per cent of total Czechoslovak exports in 1930 was made up by textiles, 13.8 per cent of total exports being cotton yarns and fabrics, 9.6 per cent woolen products and 3.8 per cent silk and rayon goods.

Coal Tar Dyes Produced and Imported.—The sole producer of coal tar dyes in Czechoslovakia is the Aussiger Verein with an output of about 2,000 tons annually. This compares with imports of about 4,000 tons in 1929, of 3,500 tons in 1930 and of only 1,300 metric tons during

(Continued on page 34)

Specifications for Grading Sulphonated Oils

(Continued from page 2)

take advantage of the outer limits for the non-essential ingredients. However, the most he may hope to gain by it is an additional fat content of about 1.5 per cent, based on the water-free sample, or about 0.75 per cent in the case of a 50 per cent oil, graded according to the proposed method. This would be of doubtful benefit since the presence in the oil of the non-essential ingredients equal to the allowable maximum would reflect upon its quality.

According to the method proposed in this paper, the grading of sulphonated oils is based upon the moisture test alone. The other tests are intended merely to determine whether or not the oil meets with the specifications, and they need only be applied where adulteration is suspected or the quality of the oil is in question. Even then no tall the tests need necessarily be made.

New Association Organizes

At a meeting held at the Hotel Pennsylvania, New York, representatives of twelve manufacturers recently completed the final organization details of the Sulphonated Oil Manufacturers Association, a new trade body, national in scope, which is comprised of most of the leading manufacturers of sulphonated oils and their products. The following officers were elected for the first year: Charles P. Gulick, National Oil Products Co., President; Chester M. Braham, the Arkansas Company, Inc., Vice-President; H. B. Sweatt, Secretary and Treasurer. The offices of the association will be at 55 West 42nd Street, New York, N. Y.

The association has been formed for the purpose of improving conditions both within the industry and between producers and consumers. To this end, a code of business practices will be adopted with the idea of promoting ethical methods of manufacturing and merchandising; to promote open and fair competition, and to discourage misrepresentations as to uses and qualities of sulphonated oils. Industry statistics relative to production, sales, shipments, and stocks on hand will be compiled and disseminated. Tariff and railroad rate matters also will be considered.

Many oils obtained by the sulphonation process have gained tremendous importance in the textile, leather, paper, glue, and other industries; but despite this fact great confustion exists in the various methods of analysis and various nomenclatures. There are many methods of testing sulphonated oils today, the Volumetric, the Rapid, the Cold Test, Separation, Simplified Comparative, Japan Wax, Benedikt, and Ether Extraction method, and the results obtained from these and other methods employed frequently vary. It will be the purpose of the Sulphonated Oil Manufacturers Association to work with the Bureau of Standards, American Association of Textile Chemists and Colorists, the American Leather Chemists Association, and other group organizations to simplify and standardize by nomenclature and method the various processes and measuring sticks used in buying and selling sulphonated oils.

Charles P. Gulick, President of the Association, in announcing the incorporation of the Association, said: "A prime factor in the organization of the manufacturers of sulphonated oils into a trade body is to improve marketing relationships between the producer and consumer.

"We plan as soon as possible to standardize analytical methods and have them accepted and recognized by the Bureau of Standards in Washington and the different consumer organizations. It will be the aim of the Association to cooperate with industries that use our products; to study their problems in which the use of sulphonated oils is concerned; to discover and disseminate data through research which will perfect and widen the uses of our products; and to foster a closer understanding between the manufacturers and the users of sulphonated oils.

"It is the hope of the organization that the badge of membership in the Sulphonated Oil Manufacturers Association will guarantee a high order of business integrity and responsibility on the part of all sellers to all buyers."

The Sulphonated Oil Manufacturers Association is incorporated under the laws of New York State. Among the leading producers affiliated with the new organization as charter members are: Atlas Refinery; Arkansas Company, Inc.; John Campbell & Co.; Consolidated Color & Chemical Co.; A. Klipstein & Co.; the Martin Dennis Co.; National Oil Products Co.; Onyx Oil & Chemical Co.; Providence Drysalters Co.; Royce Chemical Co.; Salem Oil & Grease Co., and L. Sonneborn Sons, Inc.

Modern pH and Chlorine Control

This is a new 50-page treatise by W. A. Taylor and F. R. McCrumb which places at your disposal in condensed form the eight years' experience of these two authorities on pH and Chlorine Control. It contains a simple explanation of the meaning of pH control, a technical discussion of the subject, its application to more than thirty research and industrial problems and the approximate pH values of over one hundred acids, bases, foods, etc.

It discusses modern practice in chlorine sterilization in the treatment of water, sewage, and trade wastes, and in the manufacture of food products as well as the bleaching of textiles.

Modern pH and chlorine control equipment is described, such as the Slide Comparator, pH Slide Titrator, and the Enslow Slide Chlorimeter. These and other important phases of pH and Chlorine Control are discussed. A copy will be sent free on request by writing to W. A. Taylor & Co., Inc., 872 Linden Avenue, Baltimore, Md.

(Continued from page 32)

the first six months of the current year, reflecting the depression of the Czechoslovak textile industry. The Aussiger Verein produces sulphur black and azo dyes, but no indigo.

Dye Trade Concentrated Mostly in Europe.—The following table shows in metric tons the Czechoslovak foreign trade in coal tar dyes, according to the three groups of the customs tariff:

Country	Sulphur Blacks 1929 Tons	Sulphur Blacks 1930 Tons	Anthraquinone* 1929 Tons	Anthraquinone* 1930 Tons	Other Coal Tar Dyes 1929 Tons	Other Coal Tar Dyes 1930 Tons
IMPORTS						
Germany	355	346.2	115.7	65.0	2,507.2	2,068.4
United States	37	53.6	.....	....	26.2	131.4
Netherlands	17	6.4	1.1	0.5	112.2	107.4
Belgium	....	2.7	.....	....	4.8	11.9
Switzerland	1	1.4	17.3	20.7	605.0	568.2
Great Britain	1	1.1	.....	0.7	55.3	33.1
Hamburg	8	0.2	.....	....	48.4	14.2
Other countries	4.6	12.4	0.3	0.6	79.0	87.4
Total	423.6	424.0	134.4	87.5	3,438.1	3,022.0
EXPORTS						
Germany	1.3	12.4	1.8	8.0	124.4	98.2
Hungary	...	8.6	....	2.1	45.9	35.5
Belgium	...	4.6	....	...	6.9	11.7
Austria	...	3.6	....	0.5	32.1	44.2
Bulgaria	....	3.1	....	...	33.4	11.2
Sweden	...	3.0	....	0.3	1.6	0.8
United States	...	1.5	....	9.7	1.5	3.2
Yugoslavia	0.8	...	....	...	6.8	9.1
Netherlands	...	...	12.0	0.9	27.1	6.2
Poland	...	...	....	0.5	10.5	6.2
Other countries	0.3	1.1	0.5	0.6	55.5	26.0
Total	2.4	37.9	14.3	22.6	345.7	252.3

During the first six months of 1931 total imports continued to decline while exports improved slightly over the corresponding period of 1930. Imports during the 1931 period are as follows: Sulphur black, 69 tons; anthraquinone, 28; other 1,231; in six months 1930, sulphur black, 236 tons; anthraquinone, 37; other 1,460. Exports during these comparative periods were in 1931, sulphur black, 15 tons; anthraquinone, 10; other, 98; 1930, sulphur black, 7 tons; anthraquinone, 13; other, 96.

Fine Chemicals for the Textile Industry.—As in the case of dyes, the fine chemicals used in the textile industry are largely imported. The following textile chemicals are reported to afford special possibilities in Czechoslovakia:

Hydrogen peroxide is not manufactured in Czechoslovakia. Imports, 1930, amounted to 90 tons from Austria and 84 tons from Germany. Beta Naphthol is imported from Germany. Local production of lactic acid from fermented raw sugar is sufficient to supply about two-thirds of local consumption. Imports come principally from Germany and amounted to 44 tons during the first six months of 1931. Various antimony salts are being imported from Germany.

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

POSITION WANTED

RAYON AND COTTON DYER—Skein dyer, all types of dyes. Ten years' thorough experience. Technical college graduate. Perfect matches. Reasonable salary. Address Box No. 708, American Dyestuff Reporter, 440 Fourth Avenue, New York, N. Y.

POSITION WANTED

Salesman of chemicals, oils and dyestuffs, formerly connected with large manufacturer, is open for sales position. Have established trade and can give very satisfactory references. Apply Box No. 709, American Dyestuff Reporter, 440 Fourth Avenue, New York. N. Y.

POSITION WANTED

Textile Chemist and Colorist with ten years' practical experience, being available, solicits inquiries. Address Box No. 710, American Dyestuff Reporter, 440 Fourth Avenue, New York, N. Y.

SALESMAN WANTED

Salesman wanted for Philadelphia section. Practical knowledge of dyestuffs and specialties, especially for the hosiery trade, essential. State age, experience, salary desired and references. Reply Box No. 711, American Dyestuff Reporter, 440 Fourth Avenue, New York.

FINISHER WANTED

Finisher wanted with experience in handling silk, also silk and Celanese mixtures. Must have good experience. Address Box No. 712, American Dyestuff Reporter, 440 Fourth Avenue, New York.

WANTED

Wanted: Man with experience in boarding and examining circular knit hose. Some knowledge of dyeing an advantage. State age, experience and remuneration expected. Address Box No. 713, American Dyestuff Reporter, 440 Fourth Avenue, New York.

DYER REQUIRED

with good boil-off experience to handle sheer silk, also silk and Celanese mixed fabrics. State age and experience. Address Box No. 714, American Dyestuff Reporter, 440 Fourth Avenue, New York, N. Y.